

DEPARTMENT OF THE INTERIOR

ANNUAL REPORT

OF THE

TOPOGRAPHICAL SURVEYS  
BRANCH

1908-1909

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OTTAWA

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**ERRATA.**

Page 213.—On the second line of the third paragraph under the heading 'Survey,' 'southeast' should read 'southwest'; 'west' should read 'north.'

Page 222.—On the second line of the third paragraph under the heading 'Survey,' 'southeast' should read 'northwest.'

Page 229.—On the last line of the third paragraph under the heading 'Survey,' '1' should read '2.'

Page 232.—On the first line of the last paragraph under the heading 'Topographical Description,' 'west quarter' should read 'west half'; 'southeast' should read 'southwest.' On the second line of the same paragraph, '26' should read '28.'



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REPORT  
OF THE  
SURVEYOR GENERAL OF DOMINION LANDS  
1908-1909

DEPARTMENT OF THE INTERIOR,  
TOPOGRAPHICAL SURVEYS BRANCH,

OTTAWA, May 27, 1909.

The Deputy Minister of the Interior,  
Ottawa.

SIR,—I have the honour to submit the following report of the Topographical Surveys Branch for the fiscal year ended March 31, 1909.

During 1908 there was a demand for extensive surveys in what was formerly called the 'semi-arid' district, those portions of the northwest provinces lying between the Canadian Pacific railway and the international boundary and between Moosejaw and Lethbridge. About one hundred and forty-five townships in this district were subdivided during the year. It is expected that the surveys in this tract will be completed during 1909. Surveys were also extended in the country north and west of Edmonton, north and east of Prince Albert and in the northern part of Manitoba.

To secure more permanent monuments for quarter section corners it was decided to use iron posts instead of wooden ones. Formerly iron posts were used only at section corners. Many surveys in wooded country are performed during the winter. Iron posts as well as being more permanent are much more easily driven into the frozen ground.

Formerly the laws governing the survey of Dominion lands were comprised within the Dominion Lands Act, but in 1908 they were embodied in a separate Act called the Dominion Lands Surveys Act which was assented to March 17, 1908. The chief changes by the new Act are in relation to the resurveys of lands and the correction of errors; the Minister is given power to order a resurvey upon receipt of a petition from the owners of the lands or from parties interested as homesteaders, licensees, &c., and after public notice has been given in the *Canada Gazette* and a local newspaper for a period of four weeks. In the case of the correction of errors provision is made for compensation on account of the loss of improvements by the correction. This compensation is payable by the party acquiring the improvements, and the amount is fixed by the Minister or by an award of three arbitrators. Several resurveys and a few correction surveys have been already made under the provisions of the new Act.

SURVEYS FOR THE YEAR ENDED MARCH 31, 1909.

Like the spring of 1907, the spring of 1908 was unusually wet and surveyors had great difficulties in taking their outfits and supplies to the different localities where they were to work. Progress in the early part of the season was slow but after the wet period was over, the weather generally was very favourable for survey operations. Complete subdivision was made of three hundred and twelve whole and of twenty-three

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fractional townships, while a partial subdivision was made of one hundred and sixty-one other townships. In addition a complete resurvey was made of fifteen whole townships and of five fractional ones as well as a partial resurvey of one hundred and fifty-one others.

Seventy survey parties were in the field, sixty of which were engaged on township work and ten on miscellaneous surveys. Thirty-nine of these parties were paid by the day and thirty-one worked under contract. Of the parties under daily pay, four were employed in Manitoba, six in Saskatchewan, fifteen in Alberta, eight in British Columbia, one on the boundary between British Columbia and Yukon Territory and two in the Northwest Territories, while three others were part of the time in one province and part of the time in another. Of the parties under contract seven were located in Manitoba, eight in Saskatchewan and fifteen in Alberta, while one contract was partly in one province and partly in another.

Five parties under daily pay in charge of Messrs. P. R. A. Belanger, E. W. Hubbell, G. J. Lonergan, C. F. Miles and L. E. Fontaine were engaged for the greater part of the time on the inspection of surveys performed under contract. Forty contracts were examined during the year. The balance of the time of the inspectors was given to the investigation of reported errors, the correction of errors and the performance of other miscellaneous surveys.

The reports of the surveyors who were working under daily pay are given as appendices No. 13 to No. 50 of this report. The field of operations embraced the country extending from the eastern boundary of Manitoba to the western boundary of Alberta and from the international boundary as far north as township 107, a distance of about 650 miles. It embraced, also, almost the entire railway belt in British Columbia.

#### MISCELLANEOUS CORRECTION, RESTORATION AND TOWNSHIP SUBDIVISION SURVEYS.

Mr. C. F. Aylsworth, D.L.S., continued resurvey work in the vicinity of Beausejour, in eastern Manitoba.

Messrs. C. E. Bourgault, D.L.S., and W. J. Deans, D.L.S., made several correction surveys and some resurveys in eastern Saskatchewan. Mr. Deans travelled more than 500 miles during the performance of his surveys. He found the great need in that country to be an adequate system of drainage.

Messrs. T. A. Davies, D.L.S., Jas. Warren, D.L.S., and W. H. Young, D.L.S., were engaged in extending subdivision surveys in southwestern Alberta, in the foothills of the Rocky mountains. Owing to the nature of the country survey operations in this vicinity are very tedious and difficult.

Mr. Thos. Fawcett, D.T.S., retraced a portion of the fourth meridian in southern Alberta and made several correction surveys in Saskatchewan. His report contains an interesting description of the country he passed over.

Messrs. Geo. McMillan, D.L.S., W. R. Reilly, D.L.S., and R. H. Montgomery, D.L.S., were engaged in miscellaneous resurveys and correction surveys in the vicinity of Prince Albert, Saskatchewan. Mr. Reilly expresses the opinion that the north country offers special inducements to the settler of small means, as the wooded homestead furnishes timber for building and wood for fuel, while winter employment may always be had with the lumbering companies.

Mr. T. H. Wiggins, D.L.S., was engaged for only a short period on a correction survey near Saskatoon, Saskatchewan.

#### SUBDIVISION SURVEYS IN THE PEACE RIVER DISTRICT.

Messrs. H. S. Holcroft, D.L.S., J. B. Saint Cyr, D.L.S., and H. W. Selby, D.L.S., were employed on necessary township subdivision and settlement surveys in the Peace River district. They all speak well of the success which settlers are meeting with in that country and foretell a prosperous future, when satisfactory means of transportation will be available.

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## SURVEYS OF BLOCK OUTLINES.

Portions of the eighth and ninth base lines west of the principal meridian were resurveyed by Wm. Christie, D.L.S., to locate an error which was indicated by the closings of these lines with other lines previously surveyed. The accuracy of subdivision surveys depends on the accuracy of the base lines; it was therefore necessary to locate and correct the error before the dependent subdivision surveys could be proceeded with.

Mr. A. H. Hawkins, D.L.S., surveyed a portion of the twelfth base and completed the survey of the thirteenth base west of the sixth meridian while Mr. A. Saint Cyr, D.L.S., surveyed a portion of the fifteenth base west of the fifth meridian and produced the sixth meridian from the fourteenth base south to the quarter section corner on the east boundary of section 25 in township 47. A perusal of the reports of Messrs. Hawkins and Saint Cyr will give a clear idea of the almost insurmountable difficulties encountered by surveyors who undertake the surveys of the governing lines in our system of survey.

Mr. A. W. Ponton, D.L.S., produced the fifth initial meridian through townships 85 to 107, inclusive. It was necessary to establish this meridian in order that base lines might be extended from it in any direction where subdivision may be required. Large settlements are already in existence on Peace river and there is some demand for subdivision surveys.

Mr. B. J. Saunders, D.L.S., produced the eleventh base line west of the fifth meridian from range 8 to range 19.

## MISCELLANEOUS SURVEYS.

Mr. David Beatty, D.L.S., made a compass survey of the limits of Porcupine forest reserve northwest of Swan River, Manitoba.

Mr. A. McFee, D.L.S., surveyed the boundaries of Buffalo Park reserve near Hardisty, Alberta.

Some necessary surveys at The Pas in the Northwest Territories were performed by Mr. E. R. Bingham, D.L.S. He foretells an important future for this settlement when the Canadian Northern Railway is completed that far.

Mr. P. A. Carson, D.L.S., continued the triangulation in the railway belt, British Columbia, south and west of Golden.

A survey to locate some coal lands on the south branch of Brazeau river in Alberta was made by Mr. T. D. Green, D.L.S.

Mr. J. E. Morrier, D.L.S., surveyed a townsite at Fort Churchill. His report gives much valuable information as to the conditions of life there and the possibilities of the country.

Necessary surveys at lakes Louise and Minnewanka, in the Rocky Mountains park, were done by Mr. A. C. Talbot, D.L.S.

Mr. W. Thibaudeau, C.E., made a preliminary investigation of the water-powers of several streams in southwestern Alberta. A mass of valuable information is furnished by his report and the maps to accompany it, which are published herewith.

Mr. J. N. Wallace, D.L.S., established the Yukon-British Columbia boundary between the Tatshenshini and Takhini rivers, a distance of about thirty-six miles.

An examination of the vacant lands in the valleys of the railway belt, British Columbia, was undertaken by Mr. A. O. Wheeler, D.L.S., for the purpose of classifying them under five heads, viz., fruit land, farming land, grazing land, timber land and worthless land. Mr. Wheeler had under his direction two sub-parties in charge of Messrs. M. P. Bridgland, D.L.S., and H. G. Wheeler respectively. The valley lands above and below Revelstoke and above Golden were examined.

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## BRITISH COLUMBIA SURVEYS.

For some years past two surveyors Messrs. J. E. Ross, D.L.S., and A. W. Johnson, D.L.S., have conducted practically all the Dominion land surveys in the railway belt. Owing to the great increase of work consequent upon the assumption by the Department of the control of timber berth surveys and upon the considerable increase in the applications for subdivision surveys it was found necessary last year to employ two more parties under Messrs. T. H. Plunkett, D.L.S., and E. W. Robinson, D. L.S., respectively. These two parties as well as the party under Mr. A. W. Johnson, were engaged in the Kamloops district. Mr. J. E. Ross was employed in the western portion of the railway belt. Some small-surveys were performed by Mr. J. A. Kirk, D.L.S.

## LATITUDE ON THE FIFTH MERIDIAN.

In the spring of 1908 Mr. G. Blanchard Dodge determined the latitude of the fifth meridian near the Athabaska river in order to ascertain the error in latitude of the corner monuments near that place. The fifth meridian was being extended northerly to the Peace river by Mr. A. W. Ponton and to guard against errors in chainage, he was instructed to observe for latitude from time to time, but this could not serve as a check unless he knew the error at his starting point near the Athabaska river. It was shown by Mr. Dodge's observation that the error was practically nothing.

The following is a comparison of the mileage surveyed every year since 1906:—

	April 1, 1908, to March 31, 1909.	April 1, 1907, to March 31, 1908.	Jan. 1, 1906, to March 31, 1907.
	Miles.	Miles.	Miles.
Township outlines.....	2,019	1,674	1,306
Section lines.....	16,985	13,710	8,962
Traverse.....	3,323	3,193	1,848
Resurvey.....	2,175	2,917	4,948
Total for season.....	24,502	21,494	17,064
Number of parties.....	67	59	56
Average miles per party.....	366	364	305

The following table shows the mileage surveyed by the parties under daily pay, and by the parties under contract:—

## WORK OF PARTIES UNDER DAILY PAY.

	April 1, 1908, to March 31, 1909.	April 1, 1907, to March 31, 1908.	Jan. 1, 1906, to March 31, 1907.
	Miles.	Miles.	Miles.
Township outlines.....	512	542	756
Section lines.....	1,004	975	1,035
Traverse.....	1,158	1,313	643
Resurvey.....	2,175	2,782	4,815
Total for season.....	4,849	5,612	7,249
Number of parties.....	36	29	29
Average miles per party.....	135	194	250



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## WORK OF PARTIES UNDER CONTRACT.

	April 1, 1908, to March 31, 1909.	April 1, 1907, to March 31, 1908.	Jan. 1, 1906, to March 31, 1907.
	Miles.	Miles.	Miles.
Township outlines.....	1,507	1,132	550
Section lines.....	15,981	12,735	7,927
Traverse.....	2,165	1,880	1,205
Resurvey.....		135	133
Total for season.....	19,653	15,882	9,815
Number of parties.....	31	30	27
Average miles per party.....	634	529	364

NOTE.—Owing to the nature of their work the parties under Messrs. P. A. Carson, W. Thibault and A. O. Wheeler are not included in the statement of mileage for the year ended March 31, 1909.

The following statement shows the average cost per mile of surveys done by contractors and by surveyors under daily pay for the year ended March 31, 1909:—

	Surveys made under day pay.	Surveys made under contract.
Total mileage surveyed.....	4,849	19,653
Total cost.....	\$ 323,054 13	\$ 358,364 61
Average cost per mile .....	66 62	18 23

## DESCRIPTIONS OF TOWNSHIPS.

Descriptions of the townships subdivided during the year have been compiled from the surveyors' reports and are given as appendix No. 51 of this report. The descriptions are in the order of township, range and meridian and are preceded by a list of the townships described.

A map accompanies this report which shows in different colours the surveys performed prior to March 31, 1908, the subdivision surveys between March 31, 1908, and March 31, 1909, and the resurveys during the same period.

## ALLOWANCES AND REMUNERATION FOR SURVEYORS UNDER DAILY PAY.

In order to induce properly educated men to qualify as Dominion land surveyors, so that the Department would have no difficulty in securing the services of competent men to carry on the surveys according to the improved, accurate and scientific methods of the present day, an Order in Council was passed on April 6, 1908, increasing the rates of pay from \$6.50 to \$7.50 per day for ordinary and block outline surveys to \$8. and \$10 per day, respectively. The remuneration of Inspectors of Surveys who are employed continuously was set at \$9 per day while in the field and \$5 per day while engaged at office work. Allowances to surveyors engaged under daily pay were set by Order in Council of April 11, 1905. These allowances were intended only for surveyors in charge of full survey parties and were found insufficient when a surveyor was engaged on a survey where he was accompanied by an assistant only. To meet this case a living allowance of \$2.50 per day each was granted to the surveyor and his assistant by Order in Council of October 16, 1908.

## RATES FOR SUBDIVISION SURVEYS.

Previous to the spring of 1908 the rates for subdivision surveys had been fixed by several Orders in Council. For convenience of reference and to better define the

different classes of work and thus remove causes for differences of opinion between contractors and the Department these several orders were consolidated by Order in Council of May 12, 1908. No change was made in the rates. The schedule of rates annexed to the Order in Council is as follows:—

*Schedule of rates to be paid for township subdivision surveys of Dominion Lands executed under contract.*

1. Section lines shall be paid for at the rate of three dollars and fifty cents per mile of line surveyed.

2. A further payment at the rate of fifty cents per chain up to ten chains in a section side, shall be made for opening, cutting and blazing the line through woods, windfalls, underbrush or heavy scrub.

3. Any opening, cutting and blazing of the line in excess of ten chains in a section side shall be paid for at the rate of twenty-five cents per chain. If the mileage charged for by the contractor for opening, cutting and blazing of lines exceeds that reported by the Inspector of Surveys, the contractor's account shall be reduced accordingly, the deduction being applied over the whole contract. No deduction, however, shall be made if the contractor's charge does not differ from the Inspector's by more than five per cent. If the lines are not sufficiently blazed a deduction may be made at such rate as the Inspector of Surveys recommends, but not exceeding two dollars per mile.

4. For the interpretation of Clauses 2 and 3, a section line shall mean the distance between two monuments at section corners or the places assigned to such corners, and this distance may include a road allowance.

5. No payment shall be made under the provisions of Clauses 2 and 3 where the line could have been measured without opening and cutting. A strict interpretation shall be given to these clauses and the field notes must show every opening of half a chain or more where no cutting was necessary in order to measure the line.

6. The part of a line chained across a marsh or other body of water, except on the ice, or measured across water by means of a triangulation, shall up to half a mile, be paid for as opening through woods when the body of water is surrounded by continuous woods. When such measurement exceeds a mile in length, one-half the distance shall be paid for as opening through woods. Distances measured by means of improper triangles shall not be paid for.

7. When the side of a section, exclusive of road allowance, is greater than ninety chains or smaller than seventy chains, the number of chains of opening or cutting which may be paid for at the rate of fifty cents per chain shall be increased or reduced in proportion to the length of the section side.

8. Only the lines actually run and marked in the field shall be paid for. Nothing shall be allowed for random and trial lines, bases of triangles and offsets. A single payment only shall be made for the north and south boundaries of townships, although they must always be run twice under the provisions of the Manual of Survey.

9. A further payment at the rate of three dollars per mile shall be made for section lines surveyed over rough or hilly country. A section side shall be classed as rough or hilly when the field notes show that it crosses a ravine not less than 100 feet deep or two ravines not less than fifty feet deep, or that the difference of level between two points of the line not more than half a mile apart exceeds 200 feet, the depths or heights being measured by aneroid barometer. In case the corner of the section falls in the ravine or on the side of the hill, payment shall be made for either of the adjoining sections but not for both.

10. A further payment at the rate of four dollars per mile may be made upon a report of the Inspector of Surveys, concurred in by the Surveyor General, stating that the survey presented unusual difficulties on account of large rivers flowing through

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deep valleys with the surrounding country broken by gullies; or on account of exceptional extensive and deep marshes. This payment shall not be made for difficulties other than those mentioned or for marshes which have been crossed on the ice. Payment, if made, shall be for the number of miles recommended in the Inspector's report.

11. A further payment at the rate of four dollars per mile shall be made for surveying the meridian outlines of a township when such outlines are included in a subdivision survey contract, but such payment shall not be made for resurveying or re-tracing lines previously surveyed.

12. Section lines resurveyed or retraced by direction of the Surveyor General, or under the provisions of the Manual of Survey, shall be paid for at the same rate as original section lines in the subdivision of a township, but no payment shall be made for the part of an outline chained under the provisions of the Manual of Survey for testing the chainage. Lines resurveyed or retraced without authority shall not be paid for. The fact that a line is obliterated or that a monument cannot be found shall not be deemed sufficient authority to resurvey or retrace the line.

13. A further payment at the rate of twenty-five cents per pit in prairie, and forty cents per pit in the woods, shall be made for erecting a boundary monument, such payment to cover the cost of planting and marking the post, building the mound and otherwise completing the monument. A witness trench shall be paid for as four pits. A stone mound shall be paid for as four pits in the woods. A long quarter section post planted in a marsh shall be paid for as two prairie pits.

14. Traverses of lakes and rivers and connecting traverses shall be paid for at the rate of eleven dollars per mile, for traverses of lakes and rivers, the distance to be paid for shall be measured along the bank of the lake or river from every point fixed by the survey in a straight line to the next point. Nothing shall be paid for offsets, but one dollar shall be deducted for every offset short of the number required by the Manual of Survey.

15. One dollar shall be paid for every statutory declaration of a settler.

16. A payment at such rate as the Surveyor General may allow, but not exceeding two dollars per mile of township outline or section line surveyed, may be made for the determination of the astronomical direction of the line of the survey.

17. The above allowances shall cover the cost of preparing the returns of the survey.

18. Iron posts used on the survey of Dominion lands will be supplied free of cost at Winnipeg and at every other place where they are kept in stock. Posts not used shall, if not returned to stores, be charged to the surveyor at forty cents each.

19. A deduction at the rate of six cents per cubic foot for deficiency in the size of the pits in excess of a foot and a half per pit shall be made from the payments to survey contractors. Further deductions at such rates as the Inspector of Surveys may recommend, shall be made for deficiencies in survey monuments, whether the deficiency be in the scattering of earth away from the pits, the marking or driving of the posts or in the general character of the monuments. These deductions shall be averaged on the monuments examined by the Inspector and shall be applied to the whole contract. Should the total amount of the deductions calculated as above, exceed thirty per cent of the amount allowed for erecting the monuments, or should the Inspector report that the monuments are too unsatisfactory to be accepted, the contractor shall be required to repair and correct them according to the standard required by the Manual of survey.

20. The lines embraced in any survey under contract must be surveyed by the surveyor in person; no payment shall be made on such contract work if otherwise performed.

## SUPPLEMENT TO THE MANUAL OF SURVEY.

In 1892 a fourth edition of the Manual of Instructions for the Survey of Dominion Lands was issued containing thirteen tables specially adapted to the survey of Dominion lands. The fifth and sixth editions issued in 1903 and 1905, respectively, contained only eight tables. The tables omitted were those seldom used and it was thought that when needed they could be referred to in the fourth edition.

The fourth edition having become scarce a reprint of the tables was necessary. The Manual proper, owing to the nature of its contents, has to be revised at frequent intervals and as no change is necessary in the tables it was considered advisable to publish them separately as a supplement. This has been done and the supplement in a convenient form has been issued to all Dominion land surveyors and to a few others closely connected with those surveys. It will not be necessary to publish the tables in future editions of the Manual proper.

The construction and use of the tables are fully explained in the supplement and are further elucidated by means of problems connected with the system of survey.

## MANUAL OF SURVEY.

Some important changes have been made, since the issue of the sixth edition of the Manual in 1905, in the methods of survey and in the rates of remuneration for surveyors under daily pay. A booklet of amendments was issued in 1906 and a circular making a few further amendments was issued in 1908. The sixth edition of the Manual being almost exhausted, it is necessary to prepare another revision. Amendments and improvements have been introduced where necessary and the manuscript is now almost complete. It is expected that the new edition will be ready for distribution during the coming season.

THE BOUNDARY BETWEEN THE PROVINCE OF BRITISH COLUMBIA AND YUKON TERRITORY  
FROM TESLIN LAKE TO TATSHENSHINI RIVER.

The boundary between the province of British Columbia and Yukon Territory is defined by the Imperial British Columbia Act of 1866 (29 and 30 Victoria, Chapter 67) as being the sixtieth parallel of north latitude. For other boundaries of the same kind and particularly in marking the forty-ninth parallel between Canada and United States it was agreed that the term, 'parallel of latitude,' means a line passing through all points of the same astronomical latitude, and having between any two adjoining observed latitudes the curvature of the theoretic parallel.

In the year 1898, with the development of the country adjoining the boundary, questions of jurisdiction between the province and the Dominion arose and a demarcation of the boundary became imperative. In November of that year the Provincial Secretary and Minister of Mines, Victoria, B.C., addressed a communication to the Minister of the Interior, calling attention to the necessity of defining the northerly boundary of British Columbia, more particularly of that portion of country situated between the Pacific coast and Teslin lake, and asking the co-operation of the Dominion Government in order to have this boundary line established. The Minister of the Interior directed that the work of defining the boundary should be proceeded with at once, and this was done without the assistance of the province. It is expected, however, that the Provincial Government will adopt the boundary as established by the Dominion officers.

The boundary has been surveyed from Teslin lake to the west crossing of Tatshenshini river, a distance of one hundred and sixty-five miles. Sixteen points on the boundary were established from astronomical observations for latitude on the sixtieth parallel and these points were joined in adjacent pairs by arcs having the curvature of the theoretic parallel; one hundred and fifty additional monuments were established thereon.

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From Teslin lake to Takhini river, eleven points were established by G. White-Fraser, D.T.S., in 1899 and 1900, by astronomical observations for latitude with a twelve-inch altazimuth instrument, with two micrometer microscopes reading to one second of arc. The probable error in latitude of any of these points is about twenty feet.

From Takhini river to Tatshenshini river five points were established by J. N. Wallace, D.L.S., in 1907 and 1908, by astronomical observations for latitude with a Troughton and Sims zenith telescope, of twenty-eight-inch focal length. Talcott's method for observing latitude being employed. The probable error in latitude of any of these five points is from six to ten feet.

The intermediate monuments from Teslin lake to Takhini river were established by A. Saint Cyr, D.L.S., in 1899, 1900 and 1901; and those from Takhini river to Tatshenshini river by J. N. Wallace, D.L.S., in 1907 and 1908.

The method employed in establishing the intermediate monuments between stations fixed by astronomical observations is as follows:—Each latitude station was joined to the next one by a line having the curvature of the theoretic parallel at sixty degrees of north latitude, by running, as a trial line, a series of tangents to the prime vertical circles passing through the initial latitude station, and the offsets to the sixtieth parallel were calculated according to the formula:

$$\text{Offset (to parallel from tangent)} = \frac{D^2 \sin \phi}{2NC \cos \phi}$$

or  $\log$  of offset (in chains) =  $2 \log D + \log C$ , where  $D$  is the distance in chains measured from the points of tangency of the trial line with the assumed, or theoretic parallel passing through the initial astronomical station, and  $C$  is a constant whose logarithm is  $\bar{6}.4352819$ .

In closing on an astronomical station the residual offset due to difference in station error of the two latitude stations was distributed proportionately at all the monuments.

Linear measurements along the trial line were made by Mr. Saint Cyr with a Langeol micrometer, and by Mr. Wallace by triangulation with chained bases.

The monuments consist of an iron post, three feet long and three-quarters of an inch in diameter, driven flush with the ground. This iron post defines the boundary. Its position is shown by a wooden post planted beside it, standing, as a rule, about four and one-half feet out of the ground, and surrounded by a circular cairn of stones, or an earth mound, about seven feet in diameter and four feet high. In some cases, owing to the nature of the ground or for other reasons, the iron post was omitted, and the wooden post defines the boundary. A complete description of each monument was recorded by the surveyor and is shown on the plan of the boundary.

Between monument 118 (station L) on Takhini river, and station T, on Hendon river, a distance of nine miles, no monuments were established, owing to the roughness of this part of the country, over which it was impracticable to run the boundary line.

The wooden posts are marked with the letters B. C. (signifying British Columbia) on the south side, and Y. (signifying Yukon) on the north side. The posts are not numbered on the ground, although a system of consecutive numbers has been adopted to designate the monuments, beginning with No. 1 at Teslin lake and ending with No. 166 at the west crossing of Tatshenshini river. It is the intention to have them numbered on the ground according to this system in the near future.

The monuments have been established where the boundary intersects the most important lakes, rivers and valleys, such as Teslin lake, Narrows lake, Happy valley, Atlin lake, Taku arm, Windy arm, Bennett lake, Munroe lake, Partridge lake, Primrose river, Takhini river, Hendon river, Kusawa river, Blanchard river and Tatshenshini river, and also at intermediate points wherever practicable, the distance between the monuments averaging about one mile. In many places ranges of high mountains

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have been crossed, the highest point of the boundary line being on Mt. Nevin (elevation 7,259 feet).

A plan of the boundary between the province of British Columbia and Yukon Territory at a scale of one mile to an inch is published in connection with this report. The plan shows the boundary as surveyed from Teslin lake to Tatshenshini river. The monuments are shown by square black marks and the nature of each monument indicated thus: I.P., W.P.M., signifying iron post together with a wooden post and mound. The monuments established by astronomical observations for latitude are distinguished by letters, in addition to their numbers. The distances between the monuments are shown in chains and decimals. The bearings of the lines joining adjacent monuments are shown to the nearest second, and are referred to the meridian passing through each monument. The topography is shown in the immediate vicinity of the boundary line. Elevations are shown in feet above sea-level.

Detailed information regarding the several seasons' surveys, the nature of the country, climate and other miscellaneous data may be found in the reports of G. White-Fraser, D.T.S., and A. Saint Cyr, D.L.S. (Reports of the Department of the Interior, 1900, 1901, 1902), and the reports of J. N. Wallace, D.L.S., for 1907 and 1908 (Reports of the Topographical Surveys Branch, 1907-8 and 1908-9). A few of the photographs taken by the surveyors while working on the boundary accompany this report.

## CORRESPONDENCE.

The correspondence consisted of:

Letters received. . . . .	10,592
Letters sent. . . . .	13,987

## ACCOUNTS.

The accountant's record shows:

Number of accounts dealt with. . . . .	703
Amount of accounts. . . . .	\$892,231
Number of cheques forwarded. . . . .	3,622

## OFFICE STAFF.

The office staff of the Topographical Surveys Branch at Ottawa consists of one hundred and sixty-eight employees. A list of the staff is given as appendix No. 10. There are at present seventeen vacancies, sixteen in the chief draughtsman's office and one in the geographer's office.

Many changes took place again during the past year in the personnel of the staff.

The following resigned from the staff of the chief draughtsman's office:—

Messrs. J. R. Akins, W. B. Bucknill, P. A. Carson, T. A. Davies, H. S. Day, F. H. Maynard, J. E. Morrier, A. G. Stewart, C. H. Taggart and M. B. Weekes. Messrs. A. S. Cram and C. H. Wilding were transferred to the Land Patents Branch, Messrs. G. A. Grey, J. B. Hutton and S. H. Shore to the Registration Branch and Mr. G. A. Gaudry to the Railway Lands Branch.

Messrs. G. B. Dodge, F. H. Kitto and D. F. Robertson were absent part of the time on surveys in the field.

The following new members were appointed:—Messrs. W. B. Bucknill, M. B. Bonnell, J. P. Cordukes, A. d'Orsonnens, E. J. Ebbs, A. H. Flindt, A. M. Grant, K. D. Harris, J. B. Milliken, J. P. MacMillan, B. E. Norrish, H. Osmond, W. J. Peaker, S. H. Shore, R. S. Stronach and L. N. Wadlin. Mr. H. E. Hayward returned to the staff from the Timber, Grazing and Irrigation Branch where he had been working temporarily.

Mr. W. G. Addison was added to the correspondence staff and Miss M. F. Percival was transferred to the Registration Branch.



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Three new members were appointed to the staff of the geographer's office, viz., Messrs. E. D. Bryant and Thos. Grindlay and Miss M. Stewart. Mr. C. G. Wood died; he had been attached to the staff for five years.

Mr. E. E. Bryce was transferred from the Land Patents Branch to the survey records office. Mr. Mudie of this office resigned.

Mr. H. N. Topley of the photographic office has been transferred.

Messrs. E. B. Burnett and P. Kane were appointed to the lithographic office. Mr. H. G. Grant was employed temporarily for three months during the year.

## CHIEF DRAUGHTSMAN'S OFFICE.

(*P. B. Symes.*)

The changes made by the Civil Service Amendment Act of last year have affected this office to a very great extent. For twenty-five years previous to September 1 last all the draughtsmen had been 'temporary employees' with the single exception of the chief draughtsman, although a number of them spent many years in the office. Many, however, remained a very short time and changes were so frequent that it was a continual problem how to arrange the work to the best advantage. The staff being now included in the permanent organization of the service and their remuneration being adequate it is anticipated that changes will in future be few, and this will no doubt tend towards securing a more competent staff, experience in the office itself being of great importance in a branch like this, where the business differs considerably from that in any other office.

The greater permanence of the staff has already shown results in increased efficiency, the routine of the office running more smoothly and more work being turned out without any increase in the number of draughtsmen which is the same as a year ago. This does not mean that we have sufficient help for keeping up with our requirements; in fact we need a considerable increase, being at present sixteen short of the number estimated as necessary and authorized by Order in Council. We are doing the most pressing work but there is much that ought to be done.

The tendency noted in the last report to occupy much of the time of the draughtsmen in correspondence still continues, about six thousand five hundred letters having been drafted in this part of the branch during the year.

The assistant chief draughtsman superintends the preparation of the instructions for surveyors as to the field work allotted to them and this occupies a large part of his time. The instructions vary with every case and often involve a considerable amount of study and research to provide the necessary information to arrange that the work needed in a certain locality shall be done if possible while a surveyor is in the neighbourhood and to avoid overlapping in the distribution of the field work. On the whole, our system seems to be successful; it is very seldom that any misunderstanding arises with reference to the instructions and very seldom that any surveyor has to complain of any incompleteness or mistake in getting them out.

Reports below from the heads of the different divisions give details as to operations carried on in each in the last twelve months.

## DRAUGHTING OFFICE—FIRST DIVISION—INSTRUCTIONS AND GENERAL INFORMATION.

(*T. E. Brown.*)

Owing to the augmentation of the work in this division the staff has been increased from nineteen to twenty-one employees.

Two employees are engaged in preparing instructions to the surveyors in charge of parties in the field. Instructions were drafted for one hundred and twenty-four survey parties. Before instructions for any particular survey can be intelligently

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compiled it is necessary to collect all available information as to Dominion land, Indian reserve or other surveys already made in the vicinity; this takes the time of five employees. Nineteen hundred and one sketches and 334 maps and tracings were made to accompany the instructions.

The various office registers, in which a record is kept of the surveys performed each year by each surveyor, and of the progress of each surveyor's work in the field take the whole time of two men. It is very important that these records be carefully and accurately kept, as a slight error might entail difficulties and serious losses to the surveyors, as well as errors in the township and other plans compiled in the office. Thirteen hundred and eight progress sketches were received from surveyors in the field, also 673 books of field notes of township surveys, 77 books and 503 plans of miscellaneous surveys, 276 timber reports, 436 statutory declarations of settlers and 11 sheets of observations for magnetic declination. Returns of the surveys of 300 separate blocks of timber berths were also received.

After complete examination 615 books of field notes were placed on record, together with 429 notes and plans of miscellaneous surveys and 436 statutory declarations.

Plans of 609 townships and 14 settlements or townsites, and 48 sectional maps were received from the lithographic office, posted in the registers and distributed.

Preliminary plans were issued for 416 townships, four copies of each being furnished. Two members of the staff are occupied a considerable part of the time in preparing these plans; the remainder of their time is devoted to preparing sketches for instructions.

One employee deals with communications from settlers and others on miscellaneous subjects, answers inquiries from other branches of the Department and prepares descriptions of parcels of land for the purpose of transfers and patents. The number of communications in this connection was 1,270, involving the preparation of 329 sketches, 38 maps and tracings and 463 pages of copies of field notes.

A set of sectional maps on a scale of three miles to the inch is being prepared, showing the closings of township surveys. These maps illustrate in a convenient form all discrepancies in the surveys and enable the officials when drafting instructions to point out to the surveyors irregularities they may expect to find in the surveys on the ground. Two employees have been engaged the whole year on these maps, twenty-three of which have been completed.

A general report of survey operations from 1869 to 1889 was published in the annual report of the Department of the Interior for 1891. Two members of the staff are now working on a similar report embracing operations up to the present time. The need of such data for reference has been felt for a long time, but, owing to the pressure of other work, its compilation has been deferred from year to year. It is hoped to have it ready for publication in the next annual report of this branch.

It is expected that there will be ready for publication in the same report a short history of photo-topographical survey operations in the Rocky mountains from their inception up to the present. Two other members of this division have this work now in hand. There is at present no comprehensive description of these operations, hence it is expected that this compilation will prove a valuable aid in the office as a reference, and will be of value to persons interested in photographic surveying.

Considerable work is involved in the collection of data for the annual reports of the Branch. Descriptions of the townships surveyed have to be compiled from the field notes. The reports of the surveyors on their operations for the season have to be examined and put in shape for publication. The employee who is editing the annual report devotes the whole of his time to it.

The storage vault for the branch is in charge of another member of the first division. The work of keeping in order the thousands of documents stored there keeps him busily occupied most of the time. In addition, he attends to the distribution of stationery, drawing instruments, &c., to the officials of the Branch.



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The Manual of Instructions for the Survey of Dominion Lands was revised in this division. This revision has already been mentioned. The Supplement to the Manual of Surveys was also prepared and proof-read in this division.

Four thousand and ninety draft letters and memoranda were written during the year.

## DRAUGHTING OFFICE—SECOND DIVISION—EXAMINATION OF SURVEYORS' RETURNS.

(*T. S. Nash.*)

In this division all returns of surveys of Dominion lands in the provinces of Manitoba, Saskatchewan and Alberta are examined and the plans of the surveys are compiled. The reports of the inspectors of contract surveys are examined; the contractors are notified of any discrepancies and they are given the opportunity to make the necessary corrections on the ground. These reports are used in finally accepting the work and in making up the accounts for surveys performed under contract.

The progress sketches which show the progress of the work in the field and upon which advances to the contractors are made are examined to see that all the work closes within the limits required by the Manual and that all areas made fractional by water are shown. During the past year, 1,166 of these sketches were examined including 360 sketches from inspectors.

Upon being received the final returns are first given a cursory examination, the purpose of which is to detect any serious omissions or discrepancies and if necessary, they are returned to the surveyor for correction. After this the returns of all previous surveys in the township, townsite, or settlement are collected and the compiling of the plan is proceeded with. During the year, 478 subdivision surveys, 370 outline surveys, and 63 miscellaneous surveys were examined and the compiled plans of 591 townships were sent to the draughtsmen. This number included first edition plans of 331 townships which shows the rapid rate at which the country is being opened up. Compiled plans of 13 miscellaneous surveys were also sent to be drafted. While the compiling is being carried on a very careful examination is made of the returns of the new survey and a memorandum of any discrepancies or omissions is sent to the surveyor. During the year 525 such memoranda were sent, 486 answers to memoranda were received and the necessary corrections made in the returns, and 1,240 letters in connection with the work were drafted.

This division also examined plans of 280 road diversions made by the provincial governments of Saskatchewan and Alberta, 76 plans of right of way of railways, and plans of survey of 74 timber berths.

## DRAUGHTING OFFICE—THIRD DIVISION—DRAWING FOR REPRODUCTION.

(*C. Engler.*)

The staff of this division is smaller than for two or three years past. The nominal strength is thirteen since September 1 last when the employees were admitted into the service on a permanent footing, as compared with fourteen a year ago, and fifteen the year previous. Since September 1, however, one has been permanently transferred and two temporarily employed in another Branch of the Department, one for over a month, the other for nearly three months; at the time of writing the latter is still there. It is needless to add that under these circumstances it is somewhat difficult to keep up with the work of the division.

Owing to the increased demand for space in the building at the corner of Metcalfe and Slater streets it was deemed advisable to move one of the divisions to the Imperial building on Queen street. As the work of this division is for the most part that of preparing plans for printing and consequently does not involve frequent reference to original plans, field notes and files of correspondence, it was thought that this division

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could be best separated from the others and it was accordingly moved to its present quarters. They are large and well lighted, facts which offset to some extent the disadvantage of being at a distance from the Metcalfe street building.

As said above, the principal work of the division consists in preparing plans for printing. These plans are compiled in the second and fourth divisions. In their compilation the main object is accuracy as to data; no special effort is made to form well made figures or letters, in fact the data are usually put on the plans in ordinary handwriting. In the third division these plans are copied, care being taken to make a neat, well arranged plan with all letters and figures carefully made. At present almost all the letters and figures are stamped on the plans in type, thus securing uniformity.

In 1906, a Pilot printing-press 6 x 10½ inches inside chase measurement was purchased in order to print titles, foot-notes, &c. When the use of a printing-press was first suggested for this work it was feared that it might not prove satisfactory; so in order not to have too large an outlay on what seemed a somewhat doubtful venture, the smallest and least expensive press was purchased. Two years' trial proved the press to be very useful and the results fully justified the expenditure, but it has been found to be scarcely large enough for some of the work required. The small press was therefore returned to the makers in part payment for a larger and better one 10 x 15 inches inside chase measurement. An expert printer is in charge; he also looks after all the type, ink, &c., used in connection with stamping plans. He has been kept so busy of late that a 'printer's devil' will doubtless be his next requirement.

Another improvement in the office equipment consists in a larger and better tracing frame. It may be explained that a tracing frame is simply a device to enable the draughtsman to trace out on a blank sheet of paper any plan or drawing to be copied. The credit of designing the new tracing frame belongs largely to Mr. J. E. May. In the frame formerly in use sunlight was reflected so as to pass through the plan and make the lines visible to the draughtsman. There were two objections to this; the frame could not be used to advantage when the day was dark and clouded, and it had to be placed near a window in the best light which, of course, left less good light for the ordinary work of the draughtsmen. The present frame is lighted by a series of six electric lights placed below a sheet of plate glass. Provision is made for ventilating the space around these lights so as not to heat the glass. A hood of black cloth shuts out all light from the room and renders the artificial light more effective. Two slits along the edges of the frame make it possible to trace the largest plan by simply sliding the plan through them and rolling it up as it is traced.

During the year, 612 plans of townships have been prepared for printing, together with 167 plans and drawings of a miscellaneous nature. As indicated in the annual report of 1908 the miscellaneous plans and drawings are of great variety. A mere statement of their number gives no idea of the amount of work involved in their production.

With a view to ascertaining the cost of publication of township plans a statement of the actual time spent in preparing each township plan has been kept. This practice has been followed for about five years. Occasionally the cost of publishing plans of other descriptions has been called for and therefore a statement is now being kept of the time spent in preparing all plans and drawings.

draughting office—FOURTH DIVISION—BRITISH COLUMBIA SURVEYS.

(E. L. Rowan-Legg.)

The staff of this division has been engaged in the examination of the returns of subdivision surveys, of mineral claims, of railway rights of way and of timber berths in the railway belt. Township and townsite plans for the British Columbia surveys are compiled and the fair copies of such plans for reproduction by photo-zincography

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are compared. Instructions for surveys, together with sketches and other information for the use of surveyors in the field are prepared. Replies are made to requests for information, which frequently involves the preparation of sketches and long searches for data. Preliminary plans, which allow of lands being opened for entry previous to the issue of the official plan, are prepared for lands subdivided in the railway belt.

A large number of the returns of survey of timber berths in the railway belt were examined. The work of this division has been greatly increased, not only by the examination of these returns, which heretofore was made in another branch of this Department, but also by the drafting of letters and memoranda in connection therewith.

Discrepancies having been discovered in some of the old surveys in the vicinity of Kamloops lake, the compiling of the plans of several townships, which were urgently needed, could not be proceeded with until check surveys had been made to locate the cause of the discrepancies. As soon as possible, after the completion of these surveys, the plans were compiled and copies issued.

A resurvey of the townsite of Hope was made by Mr. A. W. Johnson, D.L.S., in 1906, and a plan of the same was then commenced in this office, but could not be completed because it was found that some further surveys and corrections would be required. These were made by Mr. Johnson last year, and the plan was finished and copies were issued in January of this year.

On account of the rough character of the country in the railway belt a survey of the whole of any township is not proceeded with at one time, but section, or quarter section lines are surveyed to govern lands for which there are, or may be applications. All additional surveys which have been made since the issue of the first edition of the township plan are added to the original compiled plan, and copies are issued as a second, third or fourth edition corrected as the case may be.

The work of compiling plans of townships in the railway belt has been much complicated by having to show on them the lands which were disposed of by the Provincial Government, and which, therefore, did not form part of those transferred to the Dominion. As the boundaries of these lands do not coincide with section lines of the Dominion land system of survey they have to be accurately plotted on the plan so as to allow of the areas of fractional legal subdivision of adjoining Dominion lands being shown. This adds greatly to the time spent in the work of compiling.

## DRAUGHTING OFFICE—FIFTH DIVISION—MAPPING.

(J. Smith.)

The principal occupation of the fifth division is the interminable work of keeping the sectional maps up to date. These maps cover the surveyed area of the fertile belt of the northwest provinces from Lake of the Woods to the Rocky mountains and also the railway belt in British Columbia. Each sheet covers eight townships from south to north and an average of fourteen townships from east to west, thus comprising about one hundred and twelve townships or a little over four thousand square miles or two million five hundred and sixty thousand acres.

Up to the present time seventy-six sheets have been published and the number will be increased as the surveys are extended. No new sheets have been published during the past year but forty-six have been revised, thirty-four of these have been reprinted and the remainder are in the printers' hands and will be issued before long. Apart from the actual drawing and tracing of the sectional maps, a very considerable part of the work is the obtaining of the information required in revising. During the past year eight hundred and fifty-three plans of surveyed trails were obtained from the record office and examined for information, one hundred and fifty-five field books of township and other surveys were also obtained from the record office and used in compiling, besides two hundred and sixty-eight field books which had not yet been placed

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on record. The positions of four hundred and twenty-seven post-offices were ascertained through the Post Office Department, and a large amount of information about new railways and other items had to be collected.

In connection with the Yukon surveys the number of returns received is more than double that of last year, and a more rigid scrutiny of the surveyors' returns has caused a great increase in the correspondence and in the office work generally.

The miscellaneous drawings made by the fifth division consist of a plan of the mouth of Klondike and Bonanza rivers showing the complication of surveys at that point, a small plan of a ford across the Athabaska river, a copy of W. Thibaudeau's plans and profiles of water-powers on the Winnipeg river, a plan of the electoral districts of Yukon Territory, plans of the first system of surveys near Prince Albert and the fifth system near Port Moody, a map of the boundary between the province of British Columbia and Yukon Territory from Teslin lake to Tatsshenshini river, and a plan defining the foot of the eastern slope of the Rocky mountains from the international boundary to Peace river. The search for definite information on this last subject and a report thereon entailed the examination of one hundred and five field books, besides a large amount of other literature.

One draughtsman resigned his position since the last report but two others were appointed to the staff which now numbers eleven.

draughting office—SIXTH DIVISION—SCIENTIFIC AND TOPOGRAPHICAL WORK.

*(G. Blanchard Dodge.)*

This division was formed during the year and is to consist of thirteen employees. The duties of the division will be the control and supervision of the scientific and topographical part of the surveys.

Almost from the inception of the surveys it has been realized that valuable topographical and scientific information could easily be obtained at a small extra cost by the surveyors who are subdividing Dominion lands. A few attempts were made to collect such information but from motives of economy they were soon discontinued, the work of the surveyors being strictly limited to what was necessary for the purposes of settlement. The value of such information being now better appreciated by the public, the surveys are being made somewhat more elaborate.

As a beginning, surveyors of base lines are now taking levels along the lines. These will be ultimately connected, and will form the basis for maps showing the relief of the country. A knowledge of this relief is of the utmost importance in questions of irrigation or drainage, construction of roads, railways or canals, for the classification of agricultural lands and many other purposes.

The field notes of the surveyors contain much topographical information which has never been plotted because the office staff was insufficient; this work will now be taken up and put in shape for publication.

Although the lines of the Dominion Lands System of survey are established upon astronomical bearings, the compass is very useful in exploratory surveys and for work of a like character. Considerable information is gathered by surveyors regarding the declination, inclination and intensity, but the observations have to be co-ordinated and properly recorded. Improvements in the instruments supplied to surveyors will greatly add to the value of the observations.

The preparation of the astronomical field tables and diagrams and the calculations incidental to the business of the topographical surveys have now assumed such proportions that a special staff of mathematical experts has become a necessity. Work of this character will all be done in this division.

## SESSIONAL PAPER No. 25b

## SURVEY RECORDS OFFICE.

*(C. J. Steers.)*

The rapid increase in the routine work of the office has made it very difficult to get the time needed for readjustment of indexes and general supervision. During the months of the year when work was not so pressing some progress was made on the new loose leaf indexes. The portions being entered first are those which experience has shown most required adjustment.

A new index for field notes of township surveys has also been started and is being worked at as time is available. This index is made necessary as the old one is very congested owing to the smallness of its scale and the increasing numbers of field books affecting many of the townships.

A large portion of one man's time has been taken up supplying information for the sub-agents, chiefly in preparing for them skeleton maps of sub-agencies on a large scale showing the lands disposed of.

The increase in the number of printed and preliminary plans has been so great that it has been found necessary to divide up the work of sending them out; one person now attends to the printed plans and letters while another has charge of the preliminary plans and letters accompanying them.

A list is now kept of plans asked for which are out of print, so that these plans may be sent to the parties desiring them as soon as the reprints are received.

PHOTOGRAPHIC OFFICE—(*Process Work*).*(H. K. Carruthers.)*

After the clean copy of a plan has been completed it is handed over to the process photographer for reproduction. The plan is photographed on a wet plate and then printed on a zinc plate. From the zinc, the plan is transferred either to stone or to another zinc plate, according as it is to be printed on the flat bed or rotary offset press.

A new copying camera has been installed; it takes plates from 4 x 5 inches to 24 x 34 inches, while the largest size with the old camera was 17 x 20 inches. A great advantage of the new camera is that it is provided with very complete means of adjustment; this will improve not only the quality of the work but its accuracy.

Corrections to plans have hitherto been made mostly on the lithographic stones or zinc plates; they are now being made as much as possible on the negatives, before printing on zinc. It is found that the corrections are not only more easily made on the negatives, but the work is also finer. The only extra trouble is the striking of a proof from the negative on blue print paper.

The number of negatives made was about 200 in excess of last year.

PHOTOGRAPHIC OFFICE—(*General Work*).*(John Woodruff.)*

During dark days in winter some difficulty has been experienced in handling the large number of silver prints which we were called upon to furnish. To expedite printing, an aristo-electric lamp and cabinet have been procured. The cabinet is revolving; it holds forty 5 x 7-inch frames and twelve 11 x 14-inch frames. In the centre is a powerful arc lamp. The apparatus is a great convenience and there is no longer any delay in printing.

A dry mounting press has been purchased. With it photographs can be mounted on the thinnest mounts without curling. The improvement is particularly manifest in the case of large photographs.

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A considerable part of the chief photographer's time is taken by the work of the Immigration Branch. In this connection, he made two trips during the summer, one to the Niagara district for photographing farms and orchards, and one to the Ontario oil fields for photographing oil wells and plants. He secured a large collection of fine views. He also attended the Tercentenary celebration at Quebec and secured views of the most interesting events.

## LITHOGRAPHIC OFFICE.

(A. Moody.)

The rotary offset press mentioned in the annual report for 1907-8 has been installed and is now in operation. It has given some trouble but it is expected that all the difficulties will soon be overcome and that it will be turning out fine work. It is a fast press and particularly useful in printing large editions.

The machine for graining zinc plates set up at the same time as the rotary press is proving quite satisfactory. By using zinc instead of lithographic stones, plans or maps can be kept on the plates for new issues, the plates being easily stored away. If the plans or maps were on stone, they would have to be cleared away after printing.

A lithographic artist has been added to the staff; when not engaged in preparing lithographic stones or plates, he helps in spotting and making corrections on negatives.

Part of the plant is in the building at the corner of Metcalfe and Slater streets, the other part being in the Imperial building. This division is very inconvenient; moreover, the places are too small and too crowded for working to advantage.

## GEOGRAPHIC BOARD.

(A. H. Whitcher.)

The seventh report of the Geographic Board of Canada, being a consolidation of the decisions published in previous reports and bulletins to June 30, 1908, was published and distributed. In addition to the large number issued in 'blue book' form with other sessional papers of the Government, the Board receives 800 copies which are sent to Dominion and Provincial officials, colleges, school inspectors and libraries, also to geographical societies and map publishers in Canada and elsewhere, and the bulletins containing the decisions published in the *Canada Gazette* are distributed from time to time in like manner.

The regular monthly meetings of the Board have been well attended and special meetings have been held during the year.

Mr. Whitcher, who is a member of the Board and its secretary, has also continued the special work assigned to him as a member of the staff of the Topographical Surveys Branch.

## BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

(F. D. Henderson.).

Three meetings of the Board of Examiners were held during the year. The first was a special meeting lasting from May 2 to May 28, 1908, during which examinations were held at Ottawa, Toronto, and Calgary. The second one was a special meeting held on July 28, 1908. The third one was the regular annual meeting which began on the second Monday in February, 1909 (February 8), as provided by the Dominion Lands Surveys Act, section 9, and lasted until March 26, 1909. During this meeting examinations were held at Ottawa, Halifax, Toronto, Winnipeg, Calgary, Edmonton and Vancouver.

## SESSIONAL PAPER No. 25b

At the two examinations (May, 1908, and February, 1909), eighty-eight candidates passed the preliminary examination, thus becoming eligible to serve as articulated pupils, twenty-seven candidates passed the final examination for commission as Dominion land surveyor, and one candidate passed the examination for certificate as Dominion topographical surveyor. The names of the successful candidates are as follows:—

## PRELIMINARY EXAMINATION.

Barnes, F. M., St. John, N.B.  
 Banting, E. W., Toronto, Ont.  
 Beale, A. M., Ottawa, Ont.  
 Bennett, G. A., Eden, Ont.  
 Beresford, H. E., Grandview, Man.  
 Berry, E. W., Seaforth, Ont.  
 Bidouze, P., Edmonton, Alberta.  
 Blanchet, G. H., Ottawa, Ont.  
 Boulton, W. J., Wallaceburg, Ont.  
 Bowman, H. D., London, Ont.  
 Brown, E. C., Grenfell, Sask.  
 Buchanan, J. A., Comber, Ont.  
 Calder, J. A., Ashcroft, B.C.  
 Cameron, A., Ottawa, Ont.  
 Cannell, H. W., Ottawa, Ont.  
 Casey, J. M., Ottawa, Ont.  
 Churchill, H. W., Westport, N.S.  
 Cline, C. G., East Aurora, N.Y.  
 Colter, A. A., Keswick, N.B.  
 Dann, E. M., London, Ont.  
 Dawson, F. J., Truro, N.S.  
 de la Condamine, C., High River, Alta.  
 Donnelly, C., Winnipeg, Man.  
 Duff, M. O'R., Hamilton, Ont.  
 Elder, P. M., Ottawa, Ont.  
 Evans, S. L., Corinth, Ont.  
 Ewart, D. M., Ottawa, Ont.  
 Fletcher, J. A., Fletcher, Ont.  
 Glover, A. E., Beaverton, Ont.  
 Graham, D. A., Toronto, Ont.  
 Gray, J. E., Uxbridge, Ont.  
 Hamilton, C. T., Fort William, Ont.  
 Harvey, D. W., London, Ont.  
 Higgins, C. J., Vancouver, B.C.  
 Hobbs, W. E., Winnipeg, Man.  
 Huffman, K., Toronto, Ont.  
 Jackson, W., Toronto, Ont.  
 Johnson, R. H., Toronto, Ont.  
 Johnston, H. F., Toronto, Ont.  
 Jost, L. G., Guysborough, N.S.  
 Lloyd, N. C. A., Schomberg, Ont.  
 Loucks, R. W. E., Delisle, Sask.  
 Macdonald, G. A., Muirkirk, Ont.  
 Manny, D. E., Beauharnois, P.Q.  
 Martindale, F. S., Kingsmill, Ont.  
 Martin, W. H., St. Thomas, Ont.



Martyn, O. W., Mitchell, Ont.  
 Meader, C. H., Toronto, Ont.  
 Mitchell, A. B., Toronto, Ont.  
 Munro, F. V., Chatham, Ont.  
 Murdock, C. R., Toronto, Ont.  
 McCusker, K. F., St. Louis de Gonzague, P.Q.  
 McGarry, P. J., Merritton, Ont.  
 McKenzie, M., Lake Megantic, P.Q.  
 McLean, D. L., Ottawa, Ont.  
 McMaster, W. A. A., Palmerston, Ont.  
 McRoberts, A. A., Pontypool, Ont.  
 Narraway, A. N., Ottawa, Ont.  
 Neelands, R., Hamiota, Man.  
 Neville, E. A., Toronto, Ont.  
 Patterson, E. B., Toronto, Ont.  
 Peckover, H. J., Toronto, Ont.  
 Peters, F. H., Ottawa, Ont.  
 Pounder, J. A., Toronto, Ont.  
 Purser, R. C., Windsor, Ont.  
 Ransom, J. T., Toronto, Ont.  
 Redfern, C. R., Toronto, Ont.  
 Ritson, C. W., Edmonton, Alberta.  
 Robertson, E. D., Ottawa, Ont.  
 Robinson, W. A., Winnipeg, Man.  
 Roe, B. J., Ottawa, Ont.  
 Seibert, F. V., Southampton, Ont.  
 Sharpe, G. P., Agassiz, B.C.  
 Soars, N., Edmonton, Alberta.  
 Stewart, N. C., Nelson, B.C.  
 Stirrett, G. P., Petrolia, Ont.  
 Tate, H. W., Wimbledon, Eng.  
 Tremblay, A. J., Edmonton, Alberta.  
 Theriault, L. L., Fredericton, N.B.  
 Underwood, J. A., Lakelet, Ont.  
 Van Skiver, L. A., Fish Lake, Ont.  
 Walcott, W. H., Montreal, P.Q.  
 Walker, C. M., Guelph, Ont.  
 Warren, J. S., Strathcona, Alberta.  
 Waugh, B. W., Chicago, Ill.  
 Wilson, W. S., Sault Ste. Marie, Ont.  
 Wing, D. O., Berlin, Ont.

## FINAL EXAMINATION.

Ashton, A. W., Ottawa, Ont.  
 Baker, M. H., St. Thomas, Ont.  
 Campbell, A. J., Toronto, Ont.  
 Campbell, A. S., Kingston, Ont.  
 Chilver, H. L., Walkerville, Ont.  
 Christie, U. W., Ottawa, Ont.  
 Clunn, T. H. G., Ottawa, Ont.  
 Cochrane, M. F., Ottawa, Ont.  
 Cumming, A. L., Ottawa, Ont.  
 Cummings, A., Fernie, B.C.



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Dennis, E. M., Ottawa, Ont.  
 Dodge, G. B., Ottawa, Ont.  
 Johnson, P. N., Edmonton, Alberta.  
 Lang, J. L., Toronto, Ont.  
 McCallum, G. H., Ottawa, Ont.  
 McCaw, R. D., Welland, Ont.  
 McFarlane, J. B., Toronto, Ont.  
 Rannie, J. L., Ottawa, Ont.  
 Rice, F. W., Ottawa, Ont.  
 Rolfson, O., Walkerville, Ont.  
 Scott, W. A., Galt, Ont.  
 Summers, G. F., Winchester Ont.  
 Sykes F. H., Toronto, Ont.  
 Tremblay, A., Quebec, P.Q.  
 Westland, C. R., Ottawa, Ont.  
 Williams, G. L., Vancouver, B.C.  
 Wilson N. D., Toronto, Ont.

## D. T. S. EXAMINATION.

McColl, G. B., Winnipeg, Man.

Oaths of office and allegiance and bonds for the sum of one thousand dollars each, as required by section 25 of the Dominion Lands Surveys Act, were received from twenty-five candidates who had previously passed the examination for commission as Dominion land surveyor.

Twenty-three commissions as Dominion land surveyors were issued, as follows:—

Ashton, A. W., Ottawa, Ont.  
 Baker, M. H., St. Thomas, Ont.  
 Campbell, A. S., Kingston, Ont.  
 Christie, U. W., Chesley, Ont.  
 Chunn, T. H. G., Ottawa, Ont.  
 Cochrane, M. F., Ottawa, Ont.  
 Dodge, G. B., Ottawa, Ont.  
 Lang, J. L., Toronto, Ont.  
 McAuslan, H. J., Euphrasia, Ont.  
 McCaw, R. B., Welland, Ont.  
 McFarlane, J. B., Toronto, Ont.  
 Mitchell, B. F., Hamilton, Ont.  
 Rannie, J. L., Ottawa, Ont.  
 Rinfret, C., St. Stanislas, P.Q.  
 Robinson, E. W. P., Victoria, B.C.  
 Rolfson, O., Walkerville Ont.  
 Scott, W. A., Galt, Ont.  
 Soars, H. M. R., Edmonton, Alberta.  
 Steele, I. J., Ottawa, Ont.  
 Stewart, A. S., Edmonton, Alberta.  
 Sykes, F. H., Toronto, Ont.  
 Williams, G. L., Vancouver, B.C.  
 Wilson, N. D., Toronto, Ont.

A certificate as Dominion topographical surveyor was issued to G. B. McColl, D.I.S., Winnipeg, Manitoba.

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Every Dominion land surveyor is required to have in his possession a subsidiary standard of length (D.L.S. Act, section 35). Eighteen such standards were issued by the Secretary, and one surveyor reported that he had secured a standard from the estate of a deceased surveyor. A list of surveyors who have been furnished with standard measures up to March 31, 1909, will be found in Appendix No. 11.

The correspondence of the Board was as follows:—

Letters received. . . . .	1,717
Letters sent. . . . .	1,196

Circular letters, pamphlets and parcels sent, 600 (approx).

The questions put at the examination in February, 1909, are submitted in Appendix No. 12.

At the special meeting in May, 1908, 62 candidates presented themselves for the full preliminary examination, 15 for the limited, 18 for the final, and 1 for the examination for certificate as Dominion topographical surveyor. The affidavits and certificates of the final candidates were examined and the answers of all the candidates were read.

The meeting of July 28 dealt with a communication to the Board relative to a survey in the Yukon Territory.

At the regular meeting in February, 1909, 126 candidates presented themselves for the full preliminary examination, 21 for the limited preliminary, 34 for the final, and 2 for the D.T.S. The affidavits and the certificates of the final candidates were examined and the answers to the examination papers were read. Several communications were dealt with, and it was decided that when a surveyor obtains a standard measure from any one except the Secretary, he shall at once submit it to the Secretary to be tested.

Applications having been received from several candidates for an examination in May, the necessary question papers were prepared before adjournment.

The number of candidates examined during the year was 279 as compared with 161 during the previous year.

Mr. F. D. Henderson is the Secretary of the Board.

#### APPENDICES.

The following schedules and statements are appended:—

No. 1. Schedule of surveyors employed and work executed by them from April 1, 1908 to March 31, 1909.

No. 2. Schedule showing for each surveyor employed from April 1, 1908, to March 31, 1909, the number of miles surveyed, of township section lines, township outlines, traverses of lakes and rivers and resurvey; also the cost of the same.

No. 3. List of lots in the Yukon Territory, surveys of which have been received from April 1, 1908, to March 31, 1909.

No. 4. List of miscellaneous surveys in the Yukon Territory returns of which have been received from April 1, 1908, to March 31, 1909.

No. 5. Statement of work executed in the office of the chief draughtsman.

No. 6. List of new editions of sectional maps issued from April 1, 1908, to March 31, 1909.

No. 7. Statement of work executed in the survey records office from April 1, 1908, to March 31, 1909.

No. 8. Statement of work executed in the photographic office from April 1, 1908, to March 31, 1909.

No. 9. Statement of work executed in the lithographic office from April 1, 1908, to March 31, 1909.

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No. 10. List of employees of the Topographical Surveys Branch at Ottawa giving the name, classification, duties of office and salary of each.

No. 11. List of Dominion land surveyors who have been supplied with standard measures.

No. 12. Examination papers of the board of examiners for Dominion land surveyors.

Nos. 13 to 50. Reports of surveyors employed.

No. 51. Descriptions of surveyed townships submitted by Dominion land surveyors from April 1, 1908, to March 31, 1909.

## MAPS.

The following maps accompany this report:—

Map showing surveys and resurveys made from April 1, 1908, to March 31, 1909.

Map of the boundary between British Columbia and Yukon Territory.

Maps accompanying reports of surveyors.

I have the honour to be, Sir,

Your obedient servant,

E. DEVILLE,  
*Surveyor General.*



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## TOPOGRAPHICAL SURVEYS BRANCH.

## SCHEDULES AND STATEMENTS.

## APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them, from April 1, 1908, to March 31, 1909.

Surveyor.	Address.	Description of Work.
Aylsworth, C. F. . . .	Maçoc, Ont.. . . .	Partial subdivision of township 22, range 4; retracement and restoration survey of townships 16, range 1, and 11, range 7; partial retracement and restoration of townships 12, range 5; 16, range 7, and 17, range 8; all east of the principal meridian. Retracement and restoration survey of township 18, range 3, west of the principal meridian.
Baker, J. C. . . . .	Vermilion, Alta.. . . .	Contract No. 7 of 1908; subdivision of townships 53, 55, and 56, range 14, townships 52, 53, and 55, range 15, and townships 52, ranges 16 and 17; the northerly one-third of townships 54, ranges 14 and 15, and the southerly one-third of township 53, range 16, also the east outline of township 56, range 16; all west of the fifth meridian.
Beatty, David.. . . .	Parry Sound, Ont.. . . .	Survey of the east and south boundaries of Porcupine forest reserve in townships 39, ranges 29, 30, 31 and 32, township 40, range 28, and township 41, range 27, west of the principal meridian.
Belanger, P. R. A....	Ottawa, Ont.. . . . .	Completion of inspection of contract No. 27 of 1906; inspection of contracts Nos. 14, 26, 30 and 32 of 1907, and partial inspection of contracts Nos. 17 and 20 of 1908; traverse of Winnipeg river in townships 13 and 14, ranges 12 and 13, and in townships 15 and 16, ranges 14 and 15; traverse of Pinawa channel in township 14, range 12; traverse of islands and lakes and verification surveys in townships 15, ranges 14 and 15; all east of the principal meridian.
Bingham, E. R. . . . .	Fort William, Ont....	Survey of a parcel of land between blocks A and B of The Pas Indian reserve and extending southerly a distance of one mile from the Saskatchewan river.
Bolton, Lewis.. . . .	Listowel, Ont.. . . .	Contract No. 2 of 1908; subdivision of townships 31 and 32, ranges 14, 15 and 16, and townships 28, 29, 30, 31 and 32, range 17; all west of the fourth meridian.
Bourgault, C. E. . . . .	St. Jean Port Joli, P.Q.	Retracement and correction surveys in townships 11, 19 and 20, range 2; 9 and 20, range 3; 9, range 4; 21 and 22, range 5; 14, range

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APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
		9; 17, 20 and 21, range 13; 20 and 21, range 14; 16, range 15, and 29, range 17; survey of Doukhobor village in township 31, range 3; retracement of township 20, range 4, and partial retracement of townships 21 and 23, range 8; all west of the second meridian. Partial retracement of township 16, range 28, west of the principal meridian.
Bourgeault, A. . . . .	St. Jean Port Joli, P.Q.	Contract No. 5 of 1908; complete subdivision of townships 20, ranges 8 and 9, and partial subdivision of township 18, range 11; all east of the principal meridian.
Bray, Edgar. . . . .	Oakville, Ont. . . . .	Contract No. 6 of 1908; subdivision of township 38, range 2; partial subdivision of townships 38, ranges 1 and 3; the east outlines of townships 39 and 40, ranges 2 and 3, and traverse of lakes, in township 37, range 2; all west of the second meridian.
Carson, P. A. . . . .	Ottawa, Ont. . . . .	Triangulation surveys in British Columbia in connection with the Trigonometrical Section of the Topographical Survey of Canada. Subdivision and traverse in townships 26 and 27, range 26, west of the fifth meridian.
Cautley, R. H. . . . .	Edmonton, Alta. . . . .	Contract No. 13 of 1908; subdivision of townships 5 and 6, ranges 4, 5, 6 and 7; townships 7, 8 and 9, ranges 3, 4, 5 and 6; townships 10, ranges 3 and 6, and townships 6, ranges 2 and 3; all west of the third meridian.
Cautley, R. W. . . . .	Edmonton, Alta. . . . .	Contract No. 29 of 1908; completion of subdivision of townships 31, range 15; 32, range 18, and 34, range 19; subdivision of townships 31, range 16; 32, ranges 15, 16 and 17; 33, ranges 16, 17 and 18, 34, range 18, and 35, ranges 18, 19 and 20; partial resurvey of township 34, range 20; traverses in townships 30 and 31, range 17, and 33, range 19; survey of the east outlines of townships 36, ranges 20 and 21; all west of the principal meridian.
Christie, Wm. . . . .	Chesley, Ont. . . . .	Survey of portions of the seventh base across ranges 9 and 10; resurvey of the eighth base across ranges 11 and 12; resurvey of the ninth base across ranges 15, 16, 17 and parts of ranges 14 and 18; retracement of the ninth base across ranges 10, 11, 12, 13 and part of 14; survey of the east outlines of townships 29, 30 and part of 31, range 10; 31 and 32, range 16, and 33, 34, 35 and 36, range 17; all west of the principal meridian.
Coté, J. L. . . . .	Edmonton, Alta. . . . .	Contract No. 21 of 1908; subdivision of townships 64, ranges 19 and 20, township 66, range 18, and townships 67, ranges 16, 17, 19, 20, 21, 22 and 23; survey of the east outlines of townships 63, ranges 19 and 20, townships 65, 66 and 68, range 17, and of townships 65 and 68, range 18; all west of the fourth meridian.

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APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
Davies, T. A. . . . .	Ottawa, Ont. . . . .	Retracement of the fifth meridian from the northeast corner of section 24, township 4, to the third base; partial retracement of townships 5, 6, 7 and 8, range 1; partial subdivision of townships 8, 9, 10, 12 and 13, range 3, and of township 8, range 4; all west of the fifth meridian. Partial retracement of townships 5, 6, 7, 8 and 9, range 30, and township 9, range 29; all west of the fourth meridian.
Deans, W. J. . . . .	Brandon, Man. . . . .	Part subdivision of townships 23, ranges 20 and 21, townships 29 and 30, range 23, township 26, range 24, and township 23, range 26; miscellaneous retracement and correction surveys in townships 23, range 10, 22 and 23, range 11, 28, range 18, 30 and 31, range 21, 22, range 27, and 24, range 30, west of the principal meridian.
Driscoll, A. . . . . (See A. G. Stacey.)	Edmonton, Alta. . . . .	Contract No. 8, 1908; subdivision of townships 1 and 2, ranges 2, 3 and 4, townships 3, ranges 7, 8 and 9; townships 4 and 5, ranges 2, 3, 7, 8 and 9; survey of the east outlines of townships 3, ranges 2, 3, 4 and 5; all west of the fourth meridian.
Dumais, P. T. C. . . . .	Hull, Quebec. . . . .	Contract No. 33 of 1907; subdivision of townships 27, 28 and 29, ranges 12 and 13, and township 30, range 13; all west of the principal meridian.
Edwards, Geo. . . . .	Ponoka, Alta. . . . .	Contract No. 25 of 1908; subdivision of townships 52, ranges 7 and 8; partial subdivision of townships 52, range 9; all west of the fifth meridian.
Fairchild, C. C. . . . .	Edmonton, Alta. . . . .	Contract No. 16 of 1908; subdivision of townships 61, ranges 6 and 7, townships 62, ranges 4, 5, 6 and 7; partial subdivision of township 62, range 1; survey of the east outlines of townships 63 and 64, ranges 4, 5, 6, 7 and 8; all west of the fifth meridian. Partial subdivision of township 62, range 27, west of the fourth meridian.
Farncomb, A. E. . . . .	Lacombe, Alta. . . . .	Contract No. 12 of 1908; subdivision of townships 52, ranges 21, 22, 23 and 24, townships 53, ranges 21, 22 and 23; all west of the fifth meridian.
Fawcett, A. . . . .	Gravenhurst, Ont. . . . .	Contract No. 26 of 1908; subdivision of townships 50, 51 and 52, ranges 12 and 13, and township 50, range 14; survey of east outline of township 49, range 12; all west of the second meridian.
Fawcett, T. . . . .	Niagara Falls. . . . .	Retracement and restoration survey of the fourth meridian through townships 6 to 26 inclusive. Miscellaneous surveys in townships 10 and 11, range 22, west of the fourth meridian; miscellaneous surveys in townships 12 and 28, range 1, 50, range 6, 35, range 13, 14 and 15, range 24, and 14, range 30; all west of the third meridian. Miscel-

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APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
		laneous surveys in townships 23 range 13, 25 range 22, 50 range 26, and 41 range 27; all west of the second meridian.
Fontaine, L. E.. ..	Lévis, Que.. ..	Inspection of contracts Nos. 29 and 31 of 1907, and completion of the inspection of contracts Nos. 2, 16 and 24 of 1907; inspection of contracts Nos. 7, 18 and 27 of 1908; miscellaneous surveys in townships 55, range 5, and 57, range 7, west of the fifth meridian.
Green, T. D.. ..	Ottawa, Ont.. ..	Survey of the east outlines of townships 43 and 44, ranges 19 and 20, west of the fifth meridian; a traverse to locate coal lands on the south branch of Brazeau river.
Hawkins, A. H.. ..	Listowel, Ont.. ..	Survey of the twelfth base across ranges 15 to 19 inclusive; survey of the thirteenth base across ranges 24 to 28 inclusive; partial subdivision of township 49, range 27; survey of the east outline of township 50 and part of east outline of township 49, range 27; all west of the fifth meridian; survey of the thirteenth base across part of range 1, west of the sixth meridian.
Heathcott, R. V... ..	Edmonton, Alta.. ..	Contract No. 28 of 1908; subdivision of townships 55 and 56, ranges 12 and 13, and partial subdivision of townships 54, ranges 12 and 13; all west of the fifth meridian. Contract No. 31 of 1907; subdivision of townships 52 and 53, ranges 18, 19 and 20, west of the 5th meridian.
Holcroft, H. S.. ..	Toronto, Ont .. ..	Subdivision of townships 81, ranges 24, 25 and 26, and township 82, range 24; resurvey of the east outline of township 82, range 24, and of the north outlines of townships 80, ranges 24, 25 and 26; all west of the fifth meridian; resurvey of the sixth meridian through township 81; survey of an addition to Shaftsbury settlement.
Hopkins, M. W.. ..	Edmonton, Alta.. ..	Contract No. 19 of 1908; subdivision of townships 61, 62 and 63, range 1, townships 61, 62, 63 and 64, range 2, townships 61 and 62, ranges 3, 4, 7, 8, 9 and 10; survey of the east outlines of townships 63 and 64, ranges 8 and 10; all west of the fourth meridian.
Hubbell, E. W.. ..	Ottawa, Ont.. ..	Inspection of contracts Nos. 6, 7, 11, 13, 27 and 28 of 1907, and contracts Nos. 6 and 11 of 1908; completion of inspection of contracts Nos. 15, 20 and 21 of 1907; mounding the east boundary of townships 39 and 40, range 17, and correction survey in township 39, range 16, west of the second meridian; traverse in township 52, range 4, west of the third meridian.
Johnson, A. W.. ..	Kamloops, B.C.. ..	Subdivision in townships 5 and 12, range 27, west of the sixth meridian, and in township 21, E.C.M.; resurvey in townships 7, 8, 9 and 11, range 22, in townships 3, 4, 5, 6, 9, 10, 11 and 12, range 23, west of the sixth



## SESSIONAL PAPER No. 25b

APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
		meridian, and in township 26, E.C.M.: traverse survey in township 5, range 26, and in township 14, range 27, west of the sixth meridian; subdivision and resurvey in township 2, range 29, west of the sixth meridian, and in townships 3 and 4, range 5, west of seventh meridian; traverse and resurvey in townships 12, 13 and 16, E.C.M.; traverse and subdivision in townships 6 and 7, range 26, west of the sixth meridian; traverse, subdivision and resurvey in township 15, range 27, and townships 3, ranges 29 and 30, west of the sixth meridian; two triangulations from the Canadian Pacific railway to the boundary of the railway belt.
Kimpe, M.. . . .	Edmonton, Alta.. . .	Contract No. 18 of 1908; subdivision of townships 49, 50 and 51, range 7, and townships 55 and 56, ranges 9, 10 and 11, and completion of the subdivision of township 54, range 11; all west of the fifth meridian.
Kirk, J. A.. . . .	Revelstoke, P.C.. . .	Partial subdivision of townships 23, ranges 2 and 5, west of the sixth meridian.
Kitto, F. H.. . . .	Ottawa, Ont.. . . .	Contract No. 11 of 1908; subdivision of townships 52, ranges 3 and 4, west of the third meridian.
Knight, R. H.. . .	Edmonton, Alta.. . .	Contract No. 14 of 1908; subdivision of townships 61, 62 and 63, ranges 23 and 24, and township 65, range 24; all west of the fourth meridian.
Lonergan, G. J.. . .	Buckingham, Que.. .	Inspection of contracts Nos. 4 and 34 of 1907, and of contracts Nos. 2, 10, 14, 16, 21 and 23 of 1908; restoration surveys in townships 54 and 55, ranges 20 and 21, and miscellaneous surveys in township 62, range 12, township 61, range 13, townships 52, ranges 15 and 16, townships 64 and 65, range 21, township 50, range 26, and townships 51, ranges 25, 26 and 27; all west of the fourth meridian. Miscellaneous surveys in township 59, range 4, west of the fifth meridian.
McFarlane, W. G.. .	Toronto, Ont.. . . .	Contract No. 1 of 1908; subdivision of townships 7, 8, 9 and 10, ranges 7, 8, 9, 10, 11 and 12, and townships 5 and 6, range 8; survey of the east outlines of townships 5 and 6, ranges 10, 11, 12 and 13; all west of the third meridian.
McFee, A.. . . .	Red Deer, Alta.. . .	Survey of the boundaries of Buffalo Park reserve through townships 42 and 43, range 6, 42, 43 and 44, ranges 7 and 8, and township 43, range 9, west of the fourth meridian.
McGrandle, H.. . .	Wetaskiwin, Alta.. .	Contract No. 10 of 1908; subdivision of townships 60, ranges 19, 20, 21 and 22, township 59, range 21, and part of township 60, range 18; all west of the fourth meridian.

9-10 EDWARD VII., A. 1910

APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
McMillan, Geo. . . . .	Ottawa, Ont. . . . .	Resurvey of township 49, range 25, west of the second meridian; resurvey of townships 42, 43 and 44, range 1, west of the third meridian, including a resurvey of St. Laurent settlement; partial resurvey of township 35, range 5, west of the third meridian.
Miles, C. F. . . . .	Toronto, Ont. . . . .	Inspection of contracts Nos. 1, 3, 8, 9, 13 and 15 of 1908; retracement and restoration survey of townships 23, ranges 1 and 4, and townships 24, ranges 2, 3 and 4; miscellaneous surveys in townships 23, range 2, and 18, range 14; all west of the third meridian; miscellaneous surveys in township 1, range 12, township 19, range 29, and township 18, range 30; all west of the second meridian.
Molloy, John. . . . .	Winnipeg, Man. . . . .	Contract No. 24 of 1908; subdivision of townships 9 and 10, ranges 14, 15 and 16, and township 10, range 13; all east of the principal meridian.
Montgomery, R. H. . . . .	Prince Albert, Sask. . . . .	Miscellaneous surveys in townships 43 and 44, range 8, 43, range 9, 48, range 13, and 51, ranges 14 and 15, west of the third meridian, and in township 42, range 24, west of the second meridian. Contract No. 4 of 1908; subdivision of townships 51 and 52, ranges 14 and 15, townships 51, ranges 16, 17 and 18, and partial subdivision of township 50, range 14; all west of the second meridian.
Morrier, J. E. . . . .	Ottawa, Ont. . . . .	Survey of Churchill townsite.
Ord, L. R. . . . .	Calgary, Alta. . . . .	Contract No. 30 of 1908; subdivision of townships 32, range 7, 31 and 32, range 8, 30 and 31, range 9, and townships 29, 30 and 31, range 10; survey of the east outlines of townships 29, range 9, and 32, range 11; all west of the principal meridian.
Plunkett, T. H. . . . .	Salmon Arm, B.C. . . . .	Partial subdivision of townships 26, range 19, 26 and 27, range 21, 26 and 28, range 22, 28, range 23, 21, range 27, and township 21, range 28, west of the fifth meridian; partial subdivision of township 23, range 2, west of the sixth meridian; partial subdivision and resurvey of township 25, range 28, west of the fifth meridian; traverse in township 27, range 22, and township 20, range 29, west of the fifth meridian; traverse in township 20, range 1, west of the sixth meridian.
Ponton, A. W. . . . .	Macleod, Alta. . . . .	Survey of the fifth meridian from township 85 to township 107 inclusive.
Reilly, Wm. R. . . . .	Regina, Sask. . . . .	Retracement and restoration survey in townships 46, ranges 21 and 22, townships 47a, ranges 24 and 25, and township 49, range 23; partial retracement and restoration survey of townships 45 and 49, range 21, townships 44, 45 and 49, range 22, and townships 46, ranges 23 and 24; traverse in township 42, range 27; all west of the second meridian.

## SESSIONAL PAPER No. 25b

APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
Robinson, E. W..	Chase, B.C..	Partial subdivision of township 23, range 5, townships 21 and 23, range 7, and township 22, range 8; traverse survey in township 23, range 4; subdivision and traverse in township 23, range 2; subdivision and resurvey in township 22, range 6; traverse, subdivision and resurvey in township 23, range 6, and township 23, range 7; all west of the sixth meridian.
Ross, Jos. E..	Kamloops, B.C..	Partial subdivision in townships 20 and 21, range 12, townships 16 and 23, range 22, townships 20 and 21, ranges 23 and 24, and township 18, range 25; partial resurvey of townships 18 and 19, range 17, and townships 21, ranges 20 and 21; traverse, subdivision and resurvey in township 18, range 16, townships 19, ranges 12, 14, 15, 16 and 24, townships 20, ranges 13, 15, 16, 19 and 21, and township 22, range 17; subdivision and traverse in township 15, range 22, township 16, range 26, township 19, range 13, township 20, range 21, and township 23, range 23; subdivision and resurvey in township 20, range 14, township 22, range 21, and townships 17, 18 and 19, range 25; all west of the sixth meridian.
Roy, Geo. P..	Quebec..	Contract No. 27 of 1908; subdivision of townships 57, ranges 10 and 11, and township 58, range 11; all west of the fifth meridian.
Saint Cyr, A..	Ottawa, Ont..	Survey of the sixth meridian through townships 52, 51, 48 and part of 47; survey of the fifteenth base west of the fifth meridian across ranges 24, 23, 22, 21 and part of range 20.
Saint Cyr, J. B..	Montreal..	Subdivision of townships 80, ranges 3 and 4; survey of the east outlines of townships 77, 78 and 79, range 5, the south outline of township 79, range 3, and the north outline of township 78, range 4; all west of the sixth meridian; survey of Dunvegan settlement in township 80, range 4, west of the sixth meridian, and of an addition to Peace River Landing settlement in township 83, range 21, west of the fifth meridian.
Saunders, B. J..	Edmonton, Alta..	Survey of the eleventh base through ranges 8 to 18 inclusive, and part of range 19, west of the fifth meridian.
Selby, H. W..	Toronto, Ont..	Subdivision of townships 73 and 74, range 10, and township 74, range 13; partial subdivision of townships 72, ranges 3, 5, 6, and 10, townships 73, ranges 4, 5, 6, and 11, township 74, range 9, township 80, range 19, and townships 81, ranges 19 and 20; survey of the east outline of township 73, range 13, and part of the east outline of township 74, range 12; all west of the fifth meridian; retracement of the Hudson's Bay Company reserve at Lesser Slave lake.

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APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
Seymour, H. L. . . .	Edmonton, Alta. . . .	Contract No. 29 of 1907; subdivision of townships 44 and 47, range 4, townships 48 and 49, range 5, and township 49, range 6; partial resurvey of township 43, range 4; survey of the east outlines of townships 45 and 46, range 5; all west of the fifth meridian. Contract No. 22 of 1908; subdivision of townships 45 and 46, ranges 4, 5 and 6; survey of the east outlines of township 47, range 6, and townships 47 and 48, range 7; all west of the fifth meridian.
Stacey, A. G. . . . .	Ottawa, Ont. . . . .	Contract No. 8 of 1908; subdivision of townships 4 and 5, ranges 4 and 5; all west of the fourth meridian. (Deceased, balance of contract performed by A. Driscoll, D.L.S.)
Steele, I. J. . . . .	Ottawa, Ont. . . . .	Contract No. 15 of 1908; subdivision of townships 1, 2, 3 and 4, ranges 19, 20, 21 and 22, townships 2 and 3, ranges 23, 24, 25 and 26, and township 2, range 27; survey of the east outlines of townships 1, ranges 24, 25, 26, 27 and 28, and the south outlines of townships 1, ranges 23, 24, 25, 26 and 27; partial resurvey of the south outline of township 1, range 18; all west of the second meridian.
Talbot, A. C. . . . .	Calgary, Alta. . . . .	Survey of villa lots at lake Minnewanka; survey of a road from Laggan to lake Louise; partial subdivision of township 28, range 16, west of the fifth meridian.
Teasdale, C. M. . . .	Concord, Ont. . . . .	Contract No. 26 of 1907; subdivision of townships 27 and 28, ranges 10 and 11, west of the principal meridian. Contract No. 20 of 1908; subdivision of townships 25, ranges 3, 4, 5, 6 and 7, and township 26, range 7; all west of the principal meridian.
Thibaudeau, W. . . .	Ottawa, Ont. . . . .	Preliminary exploration and hydro-topographic surveys St. Mary, Waterton, Southfork and Crowsnest rivers, and on Oil Pass and Tib creeks; preliminary explorations on Belly, Oldman and Livingstone rivers, and on Pincher, Lee, Mills, Gold and Blairmore creeks.
Tyrrell, J. W. . . . .	Hamilton, Ont. . . . .	Contract No. 17 of 1908; subdivision of townships 25 and 28, range 1, east of the principal meridian; subdivision of townships 25, 26, 27 and 28, range 1, and townships 25, 26, and 27, range 2; survey of east outlines of township 28, range 3; all west of the principal meridian.
Waddell, W. H. . . .	Hamilton, Ont. . . . .	Contract No. 23 of 1908; subdivision of townships 63 and 64, range 13, townships 63, 64 and 65, ranges 14 and 15; all west of the fourth meridian.
Waldron, John. . . .	Moosejaw, Sask. . . .	Contract No. 3 of 1908; subdivision of townships 4, 5, 6 and 7, range 20, townships 5, ranges 21 and 22, townships 5 and 6, range 23, townships 1, 2, 3 and 4, ranges 26 and 27, and townships 2, 3 and 4, range 30; com-

SESSIONAL PAPER No. 25b

APPENDIX No. 1—*Continued.*

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1908, to March 31, 1909—*Continued.*

Surveyor.	Address.	Description of Work.
		pletion of subdivision of townships 6 and 7, ranges 21 and 22; all west of the third meridian; subdivision of townships 1, 2, 3, 4 and 5, range 1, west of the fourth meridian.
Wallace, J. N..	..Calgary, Alta..	Survey of the Yukon-British Columbia boundary from Tatshenshini river to Takhini river.
Warren, Jas..	..Walkerton, Ont..	Resurvey of the fourth base across ranges 2, 3 and 4; partial subdivision of township 13, range 2, townships 11, 12 and 13, range 3, townships 10 and 11, range 4, and townships 22 and 23, range 5; traverse in township 14, range 1; all west of the fifth meridian.
Watt, Geo..	..Ottawa, Ont..	Contract No. 9 of 1908; subdivision of townships 1, 2, 3, 8 and 9, range 13, townships 8, ranges 14 and 15, townships 4, 5 and 7, ranges 16 and 17, townships 4, 5, 6 and 7, ranges 18 and 19; partial subdivision of townships 7, ranges 13, 14 and 15; survey of the east outlines of township 4, range 13, and townships 6, ranges 16 and 17; all west of the third meridian.
Wheeler, A. O..	..Calgary, Alta..	Examination and classification of the lands undisposed of in the railway belt, British Columbia, above and below Revelstoke, above and below Golden and in the vicinity of Shuswap lake.
Wiggins, T. H..	..Saskatoon, Sask..	Correction survey in township 34, range 9, west of the third meridian.
Young, W. H..	..Lethbridge, Alta..	Partial subdivision of township 4, range 1, township 6, range 2, townships 5, 6 and 7, range 3, and township 7, range 4; all west of the fifth meridian; partial subdivision of township 3, range 30, and traverse in townships 11, ranges 22 and 23; all west of the fourth meridian.

9-10 EDWARD VII., A. 1910

## APPENDIX No. 2.

SCHEDULE showing for each surveyor employed from April 1, 1908, to March 31, 1909, the number of miles surveyed of township section lines, township outlines, traverses of lakes and rivers and resurvey, also cost of same.

Surveyor.	Miles of section lines.	Miles of outlines.	Miles of traverse.	Miles of resurvey.	Total mileage.	Total cost.	Cost per mile.	By day work or by contract.
Aylsworth, C. F. ....			5 30	270 50	275 80	8 cts. 9,855 09	35 73	Day.
Baker, J. C. ....	421 88	62 32	82 23		565 93	16,024 84	28 31	Contract.
Bratty, David. ....			52 50		52 50	6,733 00	128 24	Day.
†Belanger, P. R. A. ....			87 11	5 50	92 61	13,386 35		"
Bingham, E. R. ....			5 31		5 31	282 90	53 28	"
Bolton, Lewis ....	514 65		44 08		558 73	4,286 63	7 67	Contract.
Bourgault, C. E. ....			26 05	334 75	360 80	9,063 96	25 12	Day.
Bourgault, A. ....	94 34	10 08	10 50		114 92	3,363 16	29 26	Contract.
Bray, Edgar. ....	106 00	30 00	5 50		141 50	4,381 27	30 96	"
Cautley, R. H. ....	1,148 60	50 20	42 33		1,241 13	9,441 66	7 60	"
Cautley, R. W. ....	359 88	31 28	368 58		759 74	12,773 40	16 81	"
Christie, Wm. ....	10 00	52 00		64 50	126 50	7,310 57	57 79	Day.
Côté, J. L. ....	532 92	73 46	140 83		747 21	19,980 71	26 74	Contract.
Davies, T. A. ....	62 00			58 50	120 50	10,273 17	85 25	Day.
Deans, W. J. ....	33 00		16 80	127 50	177 30	8,000 00	45 12	"
*Driscoll, A. ....	880 79	90 84	117 52		1,069 15	8,880 35	8 15	Contract.
Dumais, P. T. C. ....	162 90	17 00	60 02		239 92	5,861 82	24 43	"
Edwards, Geo. ....	133 10	18 09	30 01		181 20	5,058 37	27 91	"
Fairchild, C. C. ....	348 63	113 56	131 14		593 33	16,959 50	28 58	"
Farncomb, A. E. ....	340 12	42 19	77 81		460 12	12,361 24	26 86	"
Fawcett, Adam. ....	316 21	42 20	51 46		409 87	10,957 21	26 73	"
Fawcett, Thos. ....			14 55	171 75	186 30	4,466 78	23 98	Day.
†Fontaine, L. E. ....			7 00	12 00	19 00	12,679 62		"
Green, T. D. ....	1 00	24 00	4 32		29 32	4,200 00	143 24	"
Hawkins, A. H. ....	8 00	65 50			73 50	13,500 00	183 67	"
Heathcott, R. V. ....	516 59	56 34	180 66		753 59	19,485 37	25 85	Contract.
Holcroft, H. S. ....	163 75	24 00	72 16	27 25	287 16	14,688 63	51 15	Day.
Hopkins, M. W. ....	779 23	70 29	259 05		1,108 57	27,364 48	24 68	Contract.
†Hubbell, E. W. ....			3 95		3 95	12,628 23		Day.
Johnson, A. W. ....	20 00		70 00	90 00	180 00	14,733 43	81 85	"
Kimpe, M. ....	431 21	32 68	27 33		511 22	15,334 43	29 99	Contract.
Kirk, J. A. ....	4 04		3 61	7 00	14 65	344 10	23 48	Day.
Kitto, F. H. ....	86 72		29 11		115 83	2,989 01	25 80	Contract.
Knigher, R. H. ....	336 15	35 96	42 71		414 82	11,842 63	28 55	"
†Loneragan, G. J. ....			34 40	206 75	241 15	12,319 35		Day.
McFarlane, W. G. ....	1,260 81	88 13			1,348 94	10,137 27	7 51	Contract.
McFee, A. ....			69 50		69 50	1,300 00	18 70	Day.
McGrandle, Hugh. ....	248 45		21 30		269 75	7,045 59	26 12	Contract.
McMillan, Geo. ....			96 75	221 00	317 75	10,714 79	33 72	Day.
†Miles, C. F. ....			8 00	265 00	273 00	11,492 51		"
Molloy, John. ....	476 80	42 66			519 46	15,418 30	29 68	Contract.
Montgomery, R. H. ....			19 25	8 25	27 50	828 20	30 11	Day.
Montgomery, R. H. ....	379 18	18 09	33 70		430 97	12,706 92	29 48	Contract.
Morrier, J. E. ....			66 12		66 12	5,339 04	80 74	Day.
Ord, L. R. ....	228 62	30 08	64 44		323 14	7,512 99	23 25	Contract.
Plunkett, Thos. H. ....	33 96		34 77	5 00	73 73	9,270 11	125 73	Day.
Ponton, A. W. ....		138 00			138 00	10,925 00	79 17	"
Reilly, Wm. R. ....			154 34	242 50	396 84	8,817 98	22 22	"
Robinson, E. W. ....	22 01		47 98	1 94	71 93	12,000 00	166 83	"
Ross, Jos. E. ....	116 32		68 09	31 20	215 61	11,274 80	52 29	"
Roy, Geo. P. ....	139 12		1 50		140 62	4,262 33	30 31	Contract.
Saint Cyr, A. ....		47 50			47 50	15,000 00	315 79	Day.
Saint Cyr, J. B. ....	115 00	20 00	55 60		190 60	10,450 00	54 82	"
Saunders, B. J. ....		67 50			67 50	15,100 00	223 70	"
Selby, H. W. ....	255 25	52 90	67 72		375 87	12,505 00	33 27	"
Seymour, H. L. ....	514 48	66 94	32 16		613 58	16,510 01	26 90	Contract.
*Stacey, A. G. ....	181 42	12 06			193 48	1,574 59	8 13	"
Steele, I. J. ....	1,287 55	125 03	114 14		1,527 72	10,809 58	7 07	"
Talbot, A. C. ....	2 00		8 00		10 00	667 75	66 77	Day.
Teasdale, C. M. ....	462 74	30 07	75 85		568 66	14,978 77	26 34	Contract.
Tyrrell, J. W. ....	511 22	23 59	5 77		549 58	15,996 60	29 59	"
Waddell, W. H. ....	375 22		106 73		481 95	12,304 99	25 53	"
Waldron, John. ....	1,260 51	118 59	2 93		1,382 03	10,931 49	7 91	"
Wallace, J. N. ....			35 80		36 80	15,530 09	422 01	Day.
Warren, Jas. ....	77 50	8 00	18 00	19 00	122 50	9,308 77	75 99	"
Watt, Geo. H. ....	1,125 15	173 50	5 75		1,304 40	10,829 20	8 30	Contract.
Wiggins, T. H. ....				3 50	3 50	65 00	18 57	Day.
Young, W. H. ....	79 90	13 00	4 49	2 00	99 39	9,000 00	90 55	"
	16,984 42	2,018 63	3,323 61	2,175 39	24,502 05	681,418 74		

\* Mr. A. G. Stacey, D.L.S., died and the contract was completed by A. Driscoll, D.L.S., with the same party. † Inspector of contract surveys.

## SESSIONAL PAPER No. 25b

## APPENDIX No. 3.

LIST of Lots in the Yukon Territory, survey returns of which have been received from April 1, 1908, to March 31, 1909.

## GROUP No. 1.

Lot No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.	Remarks.
41	68.1	C. S. W. Barwell	1908	*.....	Albert P. Schulze...	Surface.

## GROUP No. 2.

N 1	0.363	James Gibbon..	1907	June 10, 1908..	.....	Surface.
K 24	.....	C. W. MacPherson .....	1908	*.....	White Channel Gold Hill Hydraulic Co., Ltd. ....	"
180	46.2	C. S. W. Barwell	1908	*.....	Capt. T. H. Alcock .....	Riverview M. C.
375	51.6	" ..	1908	Feb. 23, 1908..	Ernest Sleuter. ....	New Hope M. C.
376	51.6	" ..	1908	Nov. 11, 1908..	Lizzie Olivia Craig. ....	Iron Duke M. C.
377	51.6	" ..	1908	" 11, 1908..	" .....	Black Prince M. C.
378	51.6	" ..	1908	" 11, 1908..	" .....	Belle M. C.
378	.....	" ..	1908	*.....	N. A. T. & T. Co. ....	Klondike Lode M. C.
380	51.3	" ..	1908	Nov. 11, 1908..	Lizzie Olivia Craig. ....	Chas. L. M. C.
387	640.0	C. W. MacPherson .....	1907	*.....	Dept. of Indian Affairs. ....	Indian Reserve.
389	20.85	James Gibbon..	1908	Sept. 11, 1908..	John Nicholas. ....	Tacoma M. C.
392	51.3	C. S. W. Barwell	1908	Nov. 11, 1908..	Lizzie Olivia Craig. ....	Walter D. M. C.
393	51.6	" ..	1908	" 11, 1908..	" .....	Thelma M. C.
394	51.6	" ..	1908	" 11, 1908..	" .....	Lottie M. C.
395	45.9	" ..	1908	*.....	N. A. T. & T. Co. ....	Klondike Lode Ext'n No. 1 M. C.
396	32.73	James Gibbon..	1908	Sept. 11, 1908..	Margaret J. Mitchell <i>et al.</i> ..	Comstock M. C.
398	51.65	" ..	1908	" 11, 1908..	Jane S. Orrell. ....	Silver Knight M. C.
400	47.5	C. S. W. Barwell	1908	Oct. 2, 1908..	Emil Mohr. ....	Edna M. C.
401	11.5	" ..	1908	*.....	N. A. T. & T. Co. ....	Surface.
402	11.5	" ..	1908	*.....	" .....	"
403	51.0	" ..	1908	*.....	" .....	Klondike Lode Ext'n No. 3 M. C.
404	50.5	" ..	1908	*.....	L. Schmidt .....	An Curd M. C.
405	51.6	" ..	1909	*.....	Thos. Mulcahey <i>et al.</i> ..	Dunsmuir M. C.
406	51.6	" ..	1909	*.....	" .....	Bald Eagle M. C.
407	51.6	" ..	1909	*.....	" .....	Black Jack M. C.

## GROUP No. 4.

B 3	11.24	C. W. MacPherson .....	1908	Oct. 3, 1908..	The English Church Missions	Surface.
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\* Not yet approved.

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## APPENDIX No. 3.—Continued.

LIST of Lots in the Yukon Territory, survey returns of which have been received from April 1, 1908, to March 31, 1909.—Continued.

## GROUP No. 5.

Lot. No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.	Remarks.
110	51.55	H. G. Dickson..	1907	*	A. B. Palmer .....	Centre Star M. C.
111	46.37	" ..	1907	*	" .....	Papoose M. C.
112	49.14	" ..	1907	*	" .....	Morning M. C.
113	30.35	" ..	1907	*	" .....	Mack M. C.
115	45.56	" ..	1908	*	Win. Clark .....	Verona M. C.
121	0.77	N. A. Burwash..	1908	Sept. 25, 1908..	F. R. Alley .....	Flora M. C.
122	13.15	" ..	1908	" 25, 1908..	" .....	Alma M. C.
123	9.88	" ..	1909	" 25, 1908..	" .....	Midget M. C.
124	2.09	" ..	1908	" 25, 1908..	" .....	Flora No. 2 M. C.
125	49.07	" ..	1908	" 25, 1908..	W. S. Thomas .....	Copper Chief M. C.
126	39.58	" ..	1908	" 25, 1908..	" .....	Copper Nugget M. C.
127	138.67	" ..	1908	Oct. 17, 1908..	L. E. Belney and Karl Weik ..	Manitou Copper M. C.
128	49.48	" ..	1908	" 17, 1908..	W. S. Thomas .....	Kluane M. C.
129	48.91	" ..	1908	" 17, 1908..	" .....	Little Johnnie M. C.
130	31.62	" ..	1908	" 17, 1908..	" .....	Overland M. C.
131	3.98	" ..	1908	Sept. 25, 1908..	" .....	Corsair M. C.
132	47.58	" ..	1908	Oct. 17, 1908..	L. E. Belney and Karl Weik ..	Grover M. C.
133	51.65	" ..	1908	July 15, 1908..	W. S. Thomas .....	Paragon M. C.
134	48.17	" ..	1908	Sept. 25, 1908..	" .....	Ora M. C.
135	47.08	" ..	1908	" 25, 1908..	" .....	Alvia M. C.
136	44.74	" ..	1908	July 15, 1908..	" .....	Little Frank M. C.
137	51.65	" ..	1908	" 15, 1908..	" .....	I. O. U. M. C.
138	51.65	" ..	1908	" 15, 1908..	" .....	T. and E. M. C.
139	51.38	" ..	1908	" 15, 1908..	" .....	Reta M. C.
140	51.63	" ..	1908	" 15, 1908..	" .....	Bernice M. C.
141	51.49	" ..	1908	" 15, 1908..	" .....	York M. C.
143	45.94	" ..	1908	" 8, 1908..	" .....	Helena M. C.
144	17.58	" ..	1908	" 8, 1908..	" .....	Florence M. C.
145	31.02	" ..	1908	" 8, 1908..	" .....	Iron Horse M. C.
146	13.74	" ..	1908	" 8, 1908..	S. C. Barrington .....	Carnage M. C.
148	47.03	" ..	1908	" 8, 1908..	W. S. Thomas .....	Rothsay, M. C.
149	39.24	" ..	1908	Sept. 28, 1908..	" .....	Autumn M. C.
150	12.02	" ..	1908	July 7, 1908..	" .....	Sour Dough M. C.
154	28.48	H. G. Dickson..	1908	June 29, 1908..	E. A. Dickson .....	Dick M. C.
155	45.77	" ..	1908	" 29, 1908..	Paul Jameson .....	Hope M. C.
156	51.65	" ..	1908	*	William Maher .....	Copper Cliff M. C.
157	11.35	" ..	1908	March 2, 1909..	C. H. Johnson .....	Mabel Extension
176	33.65	N. A. Burwash..	1908	July 15, 1908..	W. S. Thomas .....	Fræn M. C.
177	1.37	" ..	1908	Sept. 25, 1908..	W. L. Forrest .....	Pueblo Star No. 2 M. C.
178	16.46	" ..	1908	" 25, 1908..	K. Weik .....	Flora No. 3 (Fractional) M. C.
179	14.00	" ..	1908	Feb. 2, 1909..	P. F. Scharschmidt .....	Dawson M. C.
180	21.91	" ..	1908	Oct. 2, 1908..	A. B. Palmer .....	Surface.
181	6.36	" ..	1908	" 2, 1908..	" .....	Prudence M. C.
						Pocahautus M. C.

\*Not yet approved.



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## APPENDIX No. 3.—Continued.

LIST of Lots in the Yukon Territory, survey returns of which have been received from April 1, 1908, to March 31, 1909.—Concluded.

## GROUP No. 6.

Lot No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.	Remarks.
20	50.44	H. G. Dickson..	1907	*	J. H. Conrad..	Venus M.C.
21	51.13	"	1907	*	"	Venus No. 2 M.C.
22	11.12	"	1907	*	"	Venus Fraction M.C.
24	3.52	"	1907	*	"	Mars M.C.
25	51.08	"	1907	*	"	M. & M. M.C.
26	21.48	"	1907	*	"	Vault M.C.
27	51.65	"	19.7	*	"	Uranus M.C.
28	50.83	"	1907	*	"	Uranus No. 2 M.C.
29	23.02	"	1907	*	"	Cappella M.C.
30	44.31	"	1907	*	"	Joe Petty M.C.
31	46.75	"	1907	*	"	Little Johnny M.C.
32	32.58	"	1907	June 24, 1908..	"	Reliance M.C.
33	51.65	"	1907	*	"	Black Jack M.C.
34	51.65	"	1908	Jan. 19, 1909..	"	Montana M.C.
35	50.94	"	1908	" 19, 1909..	"	Mountain Hero M.C.
36	51.16	"	1907	*	"	Monarch M.C.
37	42.10	"	1908	Jan. 19, 1909..	"	Commander M.C.
38	35.09	"	1908	" 19, 1909..	"	Jumbo M.C.
39	35.03	"	1908	" 19, 1909..	"	O. K. M.C.
40	37.33	"	1908	*	W. P. Granger..	Lake Shore M.C.
41	10.15	"	1908	Jan. 19, 1909..	J. H. Conrad..	Fox M.C.
42	17.45	"	1908	" 19, 1909..	"	Mountain Lion M.C.
43	35.97	"	1908	" 19, 1909..	"	Elephant M.C.
44	51.65	"	1907	Apr. 24, 1908..	"	4th of July M.C.
45	50.11	"	1907	" 19, 1908..	"	Gurteen M.C.
46	43.86	"	1907	*	"	Empress M.C.
47	40.01	"	1907	*	"	Princess No. 2 M.C.
48	45.84	"	1907	*	"	T. & B. M.C.
49	40.80	"	1907	*	"	Sunrise M.C.
50	39.62	"	1907	*	"	Sunset M.C.
51	35.75	"	1907	*	"	Thistle M.C.
52	44.01	"	1907	*	"	Rose M.C.
53	6.61	"	1907	*	"	Fair Play M.C.
55	40.21	"	1907	*	"	Aurora M.C.
56	51.65	"	1907	*	"	Glacial Lake M.C.
57	19.15	"	1907	*	"	Columbian M.C.
58	24.21	"	1907	*	"	Westover M.C.
59	8.98	"	1908	Jan. 19, 1909..	"	Mamouth M.C.
61	51.65	"	1907	*	"	Caribou M.C.
62	51.55	"	1907	*	"	Pride of Yukon M.C.
63	47.48	"	1907	*	"	Pride of Yukon No. 2 M.C.
64	40.16	"	1907	*	"	Jupiter M.C.
65	51.64	"	1907	*	"	Lone Jack M.C.
66	44.79	"	1907	*	"	Chesley M.C.
67	47.67	"	1907	*	"	Eureka M.C.
68	47.42	"	1907	*	"	Eureka No. 2 M.C.
69	9.04	"	1907	*	"	Nipper M.C.
70	49.65	"	1907	*	"	Royston M.C.
71	42.90	"	1907	*	"	Pedro M.C.
72	24.80	"	1907	*	"	Vega M.C.
73	29.29	"	1907	*	"	Vanguard M.C.
74	29.14	"	1907	*	"	Dawson M.C.
75	49.86	"	1907	*	"	Bellajara M.C.
76	34.69	"	1907	*	"	Annex M.C.
77	79.91	"	1907	Mar. 2, 1909..	"	Surface
78	14.00	"	1908	*	J. M. Pooley & J. M. Stewart	Maybelle (Fraction) M.C.
98	48.89	"	1907	*	Jas. C. Grace	Washington M.C.
99	51.65	"	1908	*	Laura Hill..	Legal Tender M.C.
100	50.40	"	1908	*	E. M. Morgan..	Azurite M.C.
101	47.74	"	1908	*	"	Malachite M.C.
102	49.83	"	1908	*	"	Cromwell M.C.

\*Not yet approved.

## APPENDIX No. 4.

LIST of Miscellaneous Surveys in the Yukon Territory, returns of which have been received from April 1, 1908, to March 31, 1909.

Year.	Surveyor.	Description of Survey.
1901	P. T. C. Dumais.....	Glacier creek base line (part of) a tributary of Gold creek.
1901	" .....	Moose creek base line (part of) a tributary of Fortymile river.

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## APPENDIX No. 5.

STATEMENT of work executed in the office of the chief draughtsman:—

Letters of instruction to surveyors. . . . .	225
Progress sketches received and filed. . . . .	1,308
Declarations of settlers received and filed. . . . .	436
Returns of separate blocks of timber berths received. . . . .	300
Plans received from surveyors. . . . .	503
Field books received from surveyors. . . . .	750
Timber reports received. . . . .	276
Observations for magnetic declination received. . . . .	11
Preliminary township plans prepared. . . . .	492
Sketches made. . . . .	2,163
Maps and tracings made. . . . .	342
Plans of Yukon lots received. . . . .	154
Plans of miscellaneous Yukon surveys received. . . . .	6
Tracings of Yukon survey plans made. . . . .	163
Yukon lots reduced to 40 chains to 1 inch and plotted on group plans. . . . .	242
Yukon traverses reduced to 40 chains to 1 inch and plotted on group plans. . . . .	8
Returns of surveys examined—	
Township subdivision. . . . .	501
Township outline. . . . .	370
Road plans. . . . .	280
Railway plans. . . . .	76
Mineral claims. . . . .	17
Timber berths. . . . .	213
Correction and other miscellaneous surveys. . . . .	105
Township plans compiled. . . . .	692
Townsite settlement and other plans compiled. . . . .	14
Proofs of plans examined. . . . .	487
Township plans printed. . . . .	609
Townsite and settlement plans printed. . . . .	14
Descriptions written. . . . .	9
Pages of field notes copied. . . . .	463
Applications for various information dealt with. . . . .	2,034
Files received and returned. . . . .	2,124
Letters drafted. . . . .	6,476
Books received from record office and used in connection with office work. . . . .	5,237
Books returned to record office. . . . .	6,136
Plans other than printed township plans received from record office and used in connection with office work. . . . .	1,038
Plans returned to record office. . . . .	1,061
Volumes of plans received from record office and used in connection with office work. . . . .	93
Volumes of plans returned to record office. . . . .	105
Books sent to record office to be placed on record. . . . .	615
Plans other than township plans sent to record office to be placed on record. . . . .	429

APPENDIX No. 5—*Continued.*STATEMENT of work executed in the office of the chief draughtsman—*Continued.*

Sectional maps (3 miles to 1 inch)—	
Revised.. . . .	46
Reprinted.. . . .	34
New drawings of old worn out sheets.. . . .	1
New tracings of old worn out sheets.. . . .	8
Sectional maps (6 miles to 1 inch)—	
Reprinted.. . . .	11
Proofs of sectional sheets examined.. . . .	47

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## APPENDIX No. 6.

LIST of new editions of sectional maps issued from April 1, 1908, to March 31, 1909.  
[Scale 3 miles to 1 inch.]

No.	Name.	No.	Name.	No.	Name.	No.	Name.
18	Wood Mountain.....	72	Portage la Prairie...	166	Sounding Creek.....	268	Carlton.
19	Willowbunch.....	114	Calgary.....	167	Bad Hills.....	269	Prince Albert S.
20	Souris.....	115	Blackfoot.....	169	Touchwood.....	270	Pasquia.
21	Turtle Mountain.....	116	Rainy Hills.....	170	Yorkton.....	271	Mossy Portage.
23	Emerson.....	117	Red Deer Forks....	214	Rocky Mt. House....	317	Fort Pitt.
24	Lake of the Woods..	118	Rush Lake.....	217	Tramping Lake.....	318	Shell River.
64	Porcupine.....	119	Regina.....	218	Saskatoon.....	319	Prince Albert N.
69	Moosejaw.....	121	Riding Mountain...	219	Humboldt.....		
70	Moose Mountain....	123	Fort Alexander.....	221	Swan River.....		

[Scale 6 miles to 1 inch.]

22	Dufferin.....	215	Red Deer.....	265	Peace Hills.....	366	Saddle Lake.
164	Morley.....	216	Sullivan Lake.....	266	Ribstone Creek.....	416	La Biche.
168	The Elbow.....	264	Brazeau.....	267	Battleford.....		

## APPENDIX No. 7.

STATEMENT of work executed in the survey records office from April 1, 1908, to March 31, 1909.

Files received and dealt with. . . . .	15,078
Letters drafted. . . . .	4,741
Reports, memos. to Council, drafts. . . . .	1
Plans, tracings, &c., copied or compiled. . . . .	742
Statutory declarations copied or mailed. . . . .	407
Plans sent to agents, registrars, &c. . . . .	19,578
Pages of field notes copied. . . . .	892
Prints of plans received and stored. . . . .	179,725
Original plans received and recorded. . . . .	1,238
Original field notes received and recorded. . . . .	596
Letters written to agents. . . . .	1,444
Registered parcels mailed. . . . .	1,739

*Work performed for the Topographical Surveys Branch.*

Books searched for. . . . .	7,552
Books sent. . . . .	5,973
Books returned. . . . .	6,775
Plans searched for. . . . .	3,386
Plans sent. . . . .	2,515
Plans returned. . . . .	1,229
Volumes searched for. . . . .	99
Volumes sent. . . . .	69
Volumes returned. . . . .	132

*Work done for the Patents Branch.*

Plans searched for. . . . .	1,070
Plans sent. . . . .	1,034
Plans returned. . . . .	916
Field books searched for. . . . .	83
Field books sent. . . . .	82
Field books returned. . . . .	37

*Work done for other Branches.*

Plans searched for. . . . .	533
Plans sent. . . . .	1,034
Plans returned. . . . .	464
Field books searched for. . . . .	360
Field books sent. . . . .	352
Field books returned. . . . .	424

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## APPENDIX No. 8.

STATEMENT of work executed in the photographic office from April 1, 1908, to March 31, 1909.

—	3½ x 3½	4 x 5	5 x 7	8 x 10	10 x 12	11 x 14	16 x 18	18 x 20	24 x 30	30 x 36	36 x 42	42 x 48	Total.
Dry plate negatives .....		316	848			48							1,212
Bromide prints .....		36	44	311	8	139	179	141	50	24	8	3	1,017
Vandyke prints .....				5	17	48	108	89	86	61	32	13	459
Silver prints .....		1,322	4,293	52		21	9						5,697
Lantern transparencies .....	390												390
Photographs mounted .....			468	46	1	67	93	10					685
Wet plate negatives .....				127		134	770	230					1,261
Photo litho plates .....								872					872
	390	1,674	5,653	541	100	457	1,159	1,342	136	85	40	16	11,593

APPENDIX No. 9.

STATEMENT of work executed in the lithographic office from April 1, 1908, to March 31, 1909.

MONTH.	MAPS.		TOWNSHIPS.		FORMS, &c.	
	No.	Copies.	No.	Copies.	No.	Copies.
1908.						
April .....	11	750	50	10,000	13	7,140
May .....	1	200	38	7,600	22	7,370
June .....	11	3,850	96	19,200	4	3,550
July .....	10	55,200			3	3,200
August .....	7	6,750	7	1,400	10	14,950
September .....			92	18,400	1	3,000
October .....	3	2,700	25	5,000	6	10,175
November .....	3	3,200	25	5,000	3	750
December .....	10	4,600	73	14,600	5	8,350
1909.						
January .....	10	4,725	105	21,000	....	....
February .....	10	11,850	33	6,600	1	2,000
March .....	17	46,025	33	7,600	5	1,700
Total .....	93	139,850	582	116,400	73	62,185

RECAPITULATION.

	No.	Copies.	Impressions.	Cost.
				\$ cts.
Maps.....	93	139,850	305,317	2,659 28
Townships .....	582	116,400	118,400	4,493 04
Forms, &c.....	73	62,185	70,735	975 68
Total .. . . .	748	318,435	494,452	8,128 00



SESSIONAL PAPER No. 25b

## APPENDIX No. 10.

List of employees of the Topographical Surveys Branch at Ottawa, giving the name, classification, duties of office and salary of each.

(Metcalf Street, Corner of Slater.)

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division.		
				\$ cts.
Deville, E., D.T.S., LL.D. ....	1	A	Surveyor General.....	3,200 00
CORRESPONDENCE.				
Brady, M. ....	1	B	Secretary .....	2,100 00
Cullen, M. J. ....	3	A	Stenographer.....	1,000 00
Moran, J. F. ....	3	B	Typewriter and clerk.....	550 00
Williams, E. R. ....	3	B	Correspondence clerk.....	600 00
Lynch, F. ....	3	B	Typewriter.....	700 00
Addison, W. G. ....	3	B	Typewriter.....	500 00
Paquette, A. ....	3	B	Clerk.....	700 00
Pegg, A. ....			Messenger.....	700 00
ACCOUNTS.				
Hunter, R. H. ....	2	A	Accountant.....	1,800 00
Wilkinson, Percy.....	3	A	Asst. Accountant.....	900 00

## DRAUGHTING OFFICE.

General direction and supervision of the technical work.

Symes, P. B. ....	1	B	Chief draughtsman.....	2,100 00
Shanks, T., B.A.Sc., D.L.S.....	1	B	Asst. chief draughtsman...	2,100 00

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## APPENDIX No. 10—Continued.

## DRAUGHTING OFFICE—FIRST DIVISION.

REGISTRATION of Surveyors' plans, field notes and other documents; preparation of instructions to surveyors, annual and other reports; answering inquiries about surveys and preparing preliminary plans of townships.

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division.		
				\$ cts.
Brown, T. E., B.A.	1	B	Chief of division	2,100 00
Green, W. T., B.A., D.L.S.	2	A	Asst. chief of division	1,600 00
Umbach, J. E., Grad. S.P.S., D.L.S.	2	A	" "	1,600 00
Barber, H. G., Grad. S.P.S., D.L.S.	2	A	" "	1,600 00
Rice, F. W., Grad. School of Mining, D.L.S.	2	A	" "	1,600 00
Belleau, J. A., D.L.S.	2	A	" "	1,600 00
McRae, A. D., B.A., B. Sc.	2	B	Draughtsman	1,100 00
Carroll, M. J., Grad. S.P.S.	2	B	"	1,300 00
Grant, A. W., B.A.	2	B	"	1,100 00
Peaker, W. J., Grad. S.P.S.	2	B	"	1,600 00
Grant, A. M., B. Sc.	2	B	"	1,000 00
Milliken, J. B., B.A., B. Sc.	2	B	"	1,000 00
MacMillan, J. P., B.E.	2	B	"	1,000 00
Cordukes, J. P., B. Sc.	2	B	"	900 00
Wadlin, L. N., B. Sc.	2	B	"	900 00
Hayward, H. E., B. Sc.	2	B	"	1,000 00
Sylvain, J.	2	B	"	1,450 00
Roebon, E. C.	2	B	"	1,100 00
McLaughlin, M. J.	2	B	"	1,100 00
Holbrook, C. H.	3	B	Clerk	700 00
Burkholder, E. L.	3	B	"	550 00

## DRAUGHTING OFFICE—SECOND DIVISION.

EXAMINING the returns of surveys in Manitoba, Saskatchewan and Alberta; plotting the plans of townships and checking the accounts for contract surveys.

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division.		
				\$ cts.
Nash, T. S., Grad. S.P.S., D.L.S.	1	B	Chief of division	2,100 00
Henderson, F. D., Grad. S.P.S., D.L.S.	2	A	Asst. chief of division	1,600 00
Burgess, E. L., Grad. S.P.S., D.L.S., O.L.S.	2	A	" "	1,600 00
Dennis, E. M., B. Sc., D.L.S.	2	A	" "	1,600 00
Elder, A. J., Grad. S.P.S., D.L.S.	2	A	" "	1,600 00
Hill, S. N., Grad. S.P.S.	2	A	" "	1,600 00
Elwell, Wm., Grad. S.P.S.	2	A	" "	1,600 00
Cumming, A. L., B. Sc., D.L.S.	2	A	" "	1,600 00
Sutherland, H. E., B. Sc.	2	B	Draughtsman	1,100 00
Robertson, D. F., Grad. S.P.S.	2	B	"	1,300 00
Clunn, T. H. G., D.L.S.	2	B	"	1,450 00
Kitto, F. H., D.L.S.	2	B	"	1,200 00
Bonnell, M.B., B.A. Sc.	2	B	"	1,000 00
Norrish, B. E., B. Sc.	2	B	"	900 00
McClennan, W. D.	2	B	"	1,350 00
Roger, A.	2	B	"	1,350 00
Spreckley, R. O.	2	B	"	1,200 00
Goodday, Leonard	2	B	"	1,100 00
Williamson, F. H. H.	2	B	"	1,100 00
Webb, G. C.	2	B	"	1,100 00
Bray, R. P.	2	B	"	1,100 00
Harrison, E. W.	2	B	"	1,000 00
Ault, H. W.	2	B	"	1,000 00
d'Orsounens, A.	2	B	"	1,300 00
Stromach, R. S.	2	B	"	1,000 00
Macdonald, J. A.	3	B	Clerk	550 00
Vacant	2	B	Draughtsman	1,000 00
Vacant	2	B	"	1,000 00
Vacant	2	B	"	1,000 00

## SESSIONAL PAPER No. 25b

## APPENDIX No. 10—Continued.

## DRAUGHTING OFFICE—THIRD DIVISION.

*(Imperial Building, Queen Street.)*

COPYING plans for reproduction.

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division		
				\$ cts.
Engler, Carl, B.A., D.L.S.	2	A	Chief of division	1,750 00
May, J. E.	2	A	Asst. chief of division	1,600 00
O'Connell, J. R.	2	B	Draughtsman	1,450 00
Moule, W. J.	2	B	"	1,350 00
Helmer, J. D.	2	B	Clerk	800 00
Dawson, R. J.	2	B	"	800 00
Archambault, E.	2	B	"	800 00
Tremblay, A.	3	B	"	750 00
Brown, A.	3	B	"	650 00
Binks, C. R.	3	B	"	600 00
Elbs, E. J.	3	B	"	500 00
Watters, James	3	A	Printer	1,000 00
Vacant	3	B	Clerk	500 00

## DRAUGHTING OFFICE—FOURTH DIVISION.

*(Metcalfe Street, Corner of Slater.)*

SUPERVISING British Columbia surveys; preparing instructions; examining the returns and plotting the plans of the surveys.

Rowan-Legg, E. L.	2	A	Chief of division	1,750 00
Gillmore, E. T. B., Grad. R. M. C.	2	A	Asst. chief of division	1,700 00
Lowe, H., D.L.S.	2	A	"	1,600 00
MacDonham, W. L., B.Sc.	2	A	"	1,600 00
Morley, R. W.	2	A	"	1,600 00
Welt, W. E.	2	A	"	1,600 00
Wilson, E. E. D.	2	B	Draughtsman	1,400 00
Osmond, H.	2	B	"	1,000 00
Harris, K. D.	2	B	"	1,000 00

## DRAUGHTING OFFICE—FIFTH DIVISION.

*(Imperial Building, Queen Street.)*

COMPILING sectional maps and township index.

Smith, J.	1	B	Chief of division	2,100 00
Begin, P. A.	2	A	Asst. chief of division	1,650 00
Genest, P. F. X.	2	A	"	1,600 00
LePage, J. B.	2	A	Draughtsman	1,600 00
Blanchet, A. E.	2	B	"	1,450 00
Davies, T. E. S.	2	B	"	1,300 00
Perrin, V.	2	B	"	1,300 00
Davy, E.	2	B	"	1,100 00
Flindt, A. H.	2	B	"	1,000 00
Villeneuve, E.	2	B	"	800 00
Bergin, W.	2	B	"	800 00

9-10 EDWARD VII., A. 1910

APPENDIX No. 10—*Continued.*

## DRAUGHTING OFFICE—SIXTH DIVISION.

*(Imperial Building, Queen Street.)*

PLOTTING topographical plans; examining and plotting returns of levels on base lines; calculating and recording barometric elevations and magnetic observations; calculating astronomical field tables; testing and adjusting survey instruments.

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division		
				\$ cts.
Dodge, G. B., D.L.S.	1	B	Chief of division	2,100 00
Vacant	2	B	Computer & draughtsman	1,000 00
Vacant	2	B	" "	1,000 00
Vacant	2	B	" "	1,000 00
Vacant	2	B	" "	1,000 00
Vacant	2	B	" "	1,000 00
Vacant	2	B	" "	1,000 00
Vacant	3	B	Clerk	500 00
Vacant	3	B	"	500 00
Vacant	3	B	"	500 00
Vacant	3	B	"	500 00
Vacant	3	B	"	500 00
Vacant	3	B	"	500 00

## GEOGRAPHER'S OFFICE.

*(Woods Building, Slater Street.)*

White, James, F.R.G.S.	1	A	Chief Geographer	3,000 00
Chalifour, J. E.	1	B	" draughtsman	2,100 00
Baine, H. E.	2	A	Draughtsman	1,850 00
Taché, Henri	2	A	"	1,600 00
Anderson, W.	2	A	"	1,600 00
Bryant, E. D.	2	A	"	1,600 00
Inkster, Fred.	2	A	"	1,600 00
Beveridge, J.	2	A	"	1,600 00
Akerlindh, A.	2	B	"	1,250 00
Darrach, A. M.	2	B	"	1,100 90
Blatchley, H. M.	2	B	"	1,050 00
Dumouchel, G. E.	2	B	"	1,050 00
Grindlay, Thos.	2	B	"	1,200 00
Wilson, H. W.	2	B	"	1,050 00
Chandler, S.	2	B	"	1,000 00
Bennie, J.	2	B	"	1,000 00
Craig, R. W.	2	B	"	1,000 00
Groulx, A.	2	B	"	900 00
Gagnon, J. S.	2	B	"	900 00
McElligott, J. P.	2	B	"	800 00
Blue, W. A.	2	B	"	800 00
Pigeon, J. H.	2	B	"	800 00
Waine, Mrs. F. E.	3	B	Clerk	700 00
Martin, Miss, M. P.	3	B	Stenographer	600 00
Stewart, Miss M.	3	B	"	500 00
Merrifield, J. R.			Messenger	700 00
Vacant	2	B	Draughtsman	800 00

SESSIONAL PAPER No. 25b

APPENDIX No. 10—*Continued.*

## SURVEY RECORDS OFFICE.

*(Canadian Building Slater Street.)*

Name.	CLASSIFICATION.		Duties of Office.	Salary.
	Division	Sub-division		
				\$ cts.
Steers, C. J. ....	2	A	Clerk in charge.....	1,700 00
Currie, P. W., B.A., B.Sc., D.L.S. ....	2	A	First assistant.....	1,750 00
Surtees, W. S. ....	2	A	Clerk.....	1,600 00
Lecourt, Eugène.....	2	B	Draughtsman.....	1,550 00
Ashton, A. W., D.L.S. ....	2	B	" .....	1,250 00
Gillis, W. C., B.Sc. ....	2	B	" .....	1,200 00
Brice, E. E. ....	2	B	" .....	1,000 00
Smith, F. W. ....	2	B	" .....	900 00
Sawter, T. W. E. ....	3	A	Clerk.....	1,100 00
Belleau, Eugène, B.L. ....	3	A	" .....	1,100 00
Lambart, O. H. ....	3	A	" .....	1,100 00
Yielding, Miss A. B. ....	3	A	" .....	1,100 00
Routh, C. T. ....	3	A	" .....	900 00
Moore, R. T. ....	3	B	" .....	700 00
Landry, Narcisse.....	3	B	" .....	600 00

## GEOGRAPHIC BOARD.

*(Woods Building, Slater Street.)*

Whitcher, A. H., F.R.G.S., D.L.S. ....	2	A	Secretary.....	1,900 00
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## PHOTOGRAPHIC OFFICE.

*(Metcalfe Street, Corner of Slater Street.)*

Carruthers, H. K. ....	2	A	Process photographer.....	1,600 00
Woodruff, John.....	2	A	Chief .....	1,600 00
Whitecomb, H. E. ....	3	A	Photographer.....	1,000 00
Morgan, W. E. ....	3	A	" .....	900 00
Kilmartin, A. ....	3	B	Asst. photographer.....	800 00
Devlin, A. ....	3	B	" .....	800 00
Ouinnet, E. G. ....	3	B	Clerk.....	700 00

## LITHOGRAPHIC OFFICE (Unclassified).

*(Metcalfe Street, Corner of Slater.)*

Name.	Occupation.	Salaries.
Moody, A. ....	Foreman.....	\$25 00 per week.
Burnett, E. ....	Lithographer.....	25 00 "
Thicke, C. R. ....	" .....	22 00 "
Deslauriers, J. H. ....	Transferrer.....	20 00 "
Beggin, J. ....	Printer.....	18 00 "
Thicke, H. S. ....	" .....	18 00 "
Boyle, S. ....	Stone polisher.....	14 00 "
Gagnon, J. ....	Press feeder .....	11 00 "
Kane, P. ....	" .....	7 00 "

## APPENDIX No. 11.

List of Dominion Land Surveyors who have been supplied with Standard Measures.

Name.	Address.	Date of Appointment.	Remarks.
Austin, G. F.	Dewdney, Alta.	April 14, 1872	
Aylen, J.	North Bay, Ont.	May 29, 1885	
Aylsworth, C. F.	Madoc, Ont.	" 13, 1886	
Baker, J. C.	Vermilion, Alta.	" 18, 1906	
Baker, M. H.	Maple Creek, Sask.	Aug. 6, 1908	
Barwell, C. S. W.	Dawson, Yukon Territory.	" 21, 1894	
Bayne, G. A.	Winnipeg, Man.	April 14, 1872	
Beatty, D.	Parry Sound, Ont.	" 14, 1872	
Beatty, W.	Delta, Ont.	" 14, 1872	
Belanger, P. R. A.	Ottawa, Ont.	May 17, 1880	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Belleau, J. A.	"	" 15, 1883	Topographical Surveys Branch, Dept. of Interior.
Bigger, C. A.	"	Mar. 30, 1832	Astronomer, Dept. of Interior.
Bingham, E. R.	Fort William, Ont.	Oct. 25, 1906	
Bolton, L.	Listowel, Ont.	April 14, 1872	
Boswell, E. J.	Not known	Mar. 18, 1903	
Bourgeault, A.	St. Jean Port Joli, Que.	" 29, 1883	
Bourgeault, C. E.	"	Feb. 21, 1888	
Bourget, C. A.	Levis, Que.	May 14, 1884	
Bowman, H. J.	Berlin, Ont.	Feb. 16, 1888	
Brabazon, A. J.	Ottawa, Ont.	May 13, 1882	
Brady, J.	Golden, B.C.	April 14, 1872	
Bray, S.	Ottawa, Ont.	Nov. 14, 1883	Dept. of Indian Affairs.
Bray, L. T.	Amherstburg, Ont.	Feb. 18, 1903	
Bridgland, M. P.	Calgary, Alta.	Mar. 10, 1905	Topog. Surveys Branch, Dept. of Interior.
Brownlee, J. H.	Victoria, B.C.	April 15, 1887	
Bucknill, W. B.	Vancouver, B.C.	Mar. 19, 1908	
Burke, W.	Minnedosa, Manitoba.	April 14, 1872	
Burnet, H.	Ottawa, Ont.	June 22, 1885	
Burwash, N. A.	Whitehorse, Yukon Territory.	Mar. 6, 1907	
Burwell, H. M.	Vancouver, B.C.	Feb. 17, 1887	
Campbell, A. S.	Kingston, Ont.	Mar. 6, 1909	
Carbert, J. A.	Medicine Hat, Alta.	May 12, 1880	
Carpenter, H. S.	Regina, Sask.	Feb. 20, 1901	Dept. of Public Works for Saskatchewan.
Carroll, C.	Prince Albert, Sask.	April 14, 1872	
Carson, P. A.	Ottawa, Ont.	Feb. 22, 1906	Topog. Surveys Branch, Dept. of Interior.
Cautley, R. H.	Edmonton, Alta.	May 1, 1905	
Cautley, R. W.	"	Sept. 2, 1896	
Cavana, A. G.	Orillia, Ont.	Nov. 16, 1876	
Charlesworth, L. C.	Edmonton, Alta.	Mar. 24, 1903	Dept. of Public Works, Alberta.
Chilver, C. A.	Walkerville, Ont.	Feb. 22, 1907	
Christie, W.	Chesley, Ont.	Mar. 22, 1906	
Coates, P. C.	Golden, B.C.	April 19, 1907	
Cleveland, E. A.	Vancouver, B.C.	June 27, 1899	
Côté, J. A.	Prince Albert, Sask.	May 14, 1884	
Côté, J. L.	Edmonton, Alta.	Mar. 21, 1890	
Cotton, A. F.	New Westminster, B.C.	May 11, 1880	
Craig, J. D.	Ottawa, Ont.	Feb. 24, 1902	Boundary Surveys, Dept. of Int.
Cummings, A.	Fernie, B.C.	Mar. 3, 1909	
Cummings, J. G.	Calgary, Alta.	Feb. 17, 1904	
Dalton, J. J.	Weston, Ont.	April 17, 1879	Dominion Topographical Surveyor.
Davies, T. A.	Ottawa, Ont.	Feb. 22, 1906	
Deans, W. J.	Brandon, Man.	May 13, 1886	
Dennis, J. S.	Calgary, Alta.	Nov. 19, 1877	Dominion Topographical Surveyor, Inspector of Irrigation and British Columbia Land Commissioner, C.P.R.

SESSIONAL PAPER No. 25b

APPENDIX No. 11—*Continued.*List of Dominion Land Surveyors who have been supplied with Standard Measures—*Continued.*

Name.	Address.	Date of Appointment.	Remarks.
Denny, H. C. ....	Not known .....	April, 1, 1882	
Dickson, H. G. ....	Whitehorse, Yukon Territory	Mar. 19, 1899	
Dickson, J. ....	Fenelon Falls, Ont.	April, 14, 1872	
Dobie, J. S. ....	Regina, Sask.	Mar. 22, 1906	Dept. of Public Works for Saskatchewan.
Doupe, J. ....	Winnipeg, Man.	April, 14, 1872	
Doupe, J. L. ....	" .....	Oct. 6, 1888	Asst. Land Commissioner, C. P.R.
Drewry, W. S. ....	New Denver, B.C.	Nov. 14, 1883	
Driscoll, A. ....	Edmonton, Alta.	Feb. 23, 1887	
Drummond, T. ....	Montreal, Que.	June 24, 1878	Dominion Topographical Surveyor.
Ducker, W. A. ....	Winnipeg Man.	Mar. 30, 1883	Swamp Land Commissioner.
Dumais, P. T. C. ....	Hull, Que.	" 29, 1882	
Edwards, Geo. ....	Ponoka, Alta.	April, 14, 1872	
Ellacott, C. H. ....	Victoria, B.C.	Feb. 22, 1899	
Empey, J. M. ....	Calgary, Alta.	" 23, 1905	
Fairchild, C. C. ....	Brantford, Ont.	" 20, 1901	
Farncomb, A. E. ....	Lacombe, Alta.	Mar. 12, 1902	
Fawcett, T. ....	Niagara Falls, Ont.	Nov. 18, 1876	Dominion Topographical Surveyor.
Fawcett, A. ....	Gravenhurst, Ont.	Feb. 22, 1893	
Findlay, A. ....	Winnipeg, Man.	Mar. 21, 1908	
Fontaine, L. E. ....	Levis, Que.	Nov. 30, 1892	Inspector of surveys, Topographical Surveys Branch, Dept. of Interior.
Foster, F. L. ....	Toronto, Ont.	April, 14, 1872	
Francis, J. ....	Poplar Point, Man.	June 17, 1875	
Garden, J. F. ....	Vancouver, B.C.	May 13, 1880	
Garden, G. H. ....	Lethbridge, Alta.	April, 14, 1872	
Garden, C. ....	Not known .....	" 14, 1872	
Garner, A. C. ....	South Qu'Appelle, Sask.	May 27, 1907	
Gauvreau, L. P. ....	Not known .....	April 19, 1872	
Gibbons, J. ....	Dawson, Yukon Territory	Feb. 12, 1891	
Gordon, M. L. ....	Vancouver, B.C.	" 18, 1904	
Gordon, R. J. ....	Raymond, Alta.	Mar. 12, 1902	
Gore, T. S. ....	Victoria, B.C.	April 19, 1879	
Green, A. H. ....	Nelson, B.C.	Feb. 23, 1905	
Green, T. D. ....	Prescott, Ont.	May 19, 1884	
Green, W. T. ....	Ottawa, Ont.	Feb. 22, 1907	Topographical Surveys Branch Dept. of Interior.
Gröver, G. A. ....	Norwood, Ont.	" 18, 1904	
Harris, J. W. ....	Winnipeg, Man.	April 14, 1872	City Surveyor, Winnipeg.
Harvey, C. ....	Indian Head, Sask.	Feb. 17, 1904	
Hawkins, A. H. ....	Listowel, Ont.	Mar. 6, 1906	
Heathcott, R. V. ....	Edmonton, Alta.	May 13, 1907	
Henderson, W. ....	Not known .....	Nov. 17, 1883	
Holcroft, H. S. ....	Toronto, Ont.	Feb. 18, 1903	
Hopkins, M. W. ....	Edmonton, Alta.	" 20, 1901	
Hubbell, E. W. ....	Ottawa, Ontario.	May 19, 1884	Topographical Surveys Branch, Dept. of Interior, President of D.L.S. Association.
James, S. ....	Toronto, Ont.	April 14, 1872	
Jephson, R. J. ....	Brandon, Man.	May 12, 1880	
Johnson, A. W. ....	Kamloops, B.C.	Mar. 12, 1902	
King, W. F. ....	Ottawa, Ont.	Nov. 21, 1876	Dominion Topographical Surveyor, Chief Astronomer, Dept. of Interior.
Kimpe, M. ....	Edmonton, Alta.	May 13, 1907	
Kirk, J. A. ....	Revelstoke, B.C.	" 11, 1880	
Kitto, F. H. ....	Ottawa, Ont.	Mar. 6, 1898	Topographical Surveys Branch, Dept. of Interior.
Klotz, O. J. ....	" .....	Nov. 19, 1877	Dominion Topographical Surveyor, Astronomer, Dept. of the Interior.

## APPENDIX No. 11—Continued.

LIST of Dominion Land Surveyors who have been supplied with Standard Measures—Continued.

Name.	Address.	Date of Appointment.	Remarks.
Knight, R. H.	Edmonton, Alta.	Feb. 18, 1904	
Latimer, F. H.	Detroit, Mich.	Nov. 13, 1885	
Laurie, R. C.	Battleford, Sask.	April 27, 1883	
Lawe, H.	Ottawa, Ont.	" 14, 1872	Topographical Surveys Branch, Dept. of Interior.
Lemoine, C. E.	Quebec, Que.	Mar. 31, 1882	
Lendrum, R. W.	Strathcona, Alta.	May 15, 1880	
Loneragan, G. J.	Buckingham, Que.	Feb. 28, 1901	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Lumsden, H. D.	Ottawa, Ont.	April 14, 1872	Chief Engineer Trans. Ry.
MacPherson, C. W.	Dawson, Yukon Territory	Mar. 7, 1900	Director of Surveys, Y.T.
Magrath, C. A.	Lethbridge, Alta.	Nov. 16, 1881	Dominion Topographical Surveyor, Member of Parliament.
Meadows, W. W.	Maple Creek, Sask.	Feb. 23, 1905	District Surveyor and Town Engineer.
Miles, C. F.	Toronto, Ont.	April 14, 1872	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Moberly, H. K.	Innisfail, Alta.	" 21, 1903	
Molloy, J.	Winnipeg, Man.	" 14, 1872	
Montgomery, R. H.	Prince Albert, Sask.	Feb. 23, 1905	
Moore, H. H.	Calgary, Alta.	Feb. 17, 1904	
Morrier, J. E.	Ottawa, Ont.	May 16, 1907	
McArthur, J. J.	Ottawa, Ont.	April 17, 1879	Boundary Surveys, Dept. of Interior.
McColl, G. B.	Winnipeg, Man.	Mar. 20, 1907	Dominion Topographical Surveyor.
McDiarmid, S. S.	Vancouver, B.C.	Feb. 23, 1905	
McFadden, M.	Neepawa, Man.	April 14, 1872	
McFarlane, J. B.	Toronto, Ont.	June 3, 1908	
McFarlane, W. G.	Toronto, Ont.	May 19, 1905	
McFee, A.	Red Deer, Alta.	April 19, 1879	
McGrandle, H.	Wetaskiwin, Alta.	May 30, 1883	
McKenna, J. J.	Dublin, Ont.	April 14, 1872	
McKenzie, J.	New Westminster, B.C.	Nov. 18, 1887	Dominion Lands Agent, New Westminster.
McLean, J. K.	Ottawa, Ont.	April 1, 1882	Dept. of Indian Affairs.
MacLennan, A. L.	Toronto, Ont.	Feb. 23, 1905	
McMillan, G.	Ottawa, Ont.	" 22, 1906	
McPherson, A. J.	Dawson, Yukon Territory	" 21, 1901	
McPhillips, G.	Winnipeg, Man.	June 17, 1875	
McVittie, A. W.	Blairmore, Alta.	Mar. 30, 1882	
Nash, T. S.	Ottawa, Ont.	Feb. 18, 1904	Topographical Surveys Branch, Dept. of Interior, secretary-treasurer of the D. L. S. Assn.
Ogilvie, W.	Paris, Texas.	April 14, 1872	
O'Hara, W. F.	Ottawa, Ont.	Feb. 19, 1895	
Ord, L. R.	Hamilton, Ont.	April 1, 1882	
Parsons, J. L. R.	Regina, Sask.	Feb. 23, 1905	
Patrick, A. P.	Calgary, Alta.	Nov. 19, 1877	Dominion Topographical Surveyor.
Pearce, W.	Calgary, Alta.	May 10, 1880	
Phillips, E. H.	Saskatoon, Sask.	Feb. 24, 1902	Dept. of Public Works for Saskatchewan.
Plunkett, T. H.	Meaford, Ont.	Mar. 12, 1908	
Ponton, A. W.	Macleod, Alta.	May 18, 1881	
Proudfoot, H. B.	Saskatoon, Sask.	Mar. 28, 1882	
Rainboth, E. J.	Ottawa, Ont.	May 19, 1881	
Rainboth, G. C.	Aylmer, Que.	April 14, 1872	Boundary Surveys, Dept. of Interior.
Reid, J. L.	Ottawa, Ont.	" 14, 1872	Dept. of Indian Affairs.
Reilly, W. R.	Regina, Sask.	Nov. 17, 1881	
Richard, J. F.	Ste. Anne de la Pocatière, Que.	Feb. 13, 1882	
Rinfret, R.	Quebec, P.Q.	May 20, 1900	
Ritchie, J. F.	Nelson, B.C.	Jan. 7, 1889	



## SESSIONAL PAPER No. 25b

## APPENDIX No. 11—Continued.

LIST of Dominion Land Surveyors who have been supplied with Standard Measures—Continued.

Name.	Address.	Date of Appointment.	Remarks.
Robertson, H. H.	Not known.	April 14, 1872	
Roberts, S. A.	Victoria, B.C.	May 16, 1885	
Roberts, V. M.	Sturgeon Falls, Ont.	" 17, 1886	
Robinson, E. W.	Victoria, B.C.	" 1, 1908	
Robinson, F. J.	Regina, Sask.	Feb. 20, 1906	Dept. of Public Works for Saskatchewan.
Rolfson, O.	Walkerville, Ont.	July 11, 1908	
Rombough, M. E.	Morden, Man.	April 14, 1872	
Rorke, L. V.	Toronto, Ont.	Aug. 13, 1891	
Ross, G.	Welland, Ont.	Nov. 21, 1882	
Ross, J. E.	Kamloops, B.C.	Feb. 12, 1891	
Roy, G. P.	Quebec, Que.	Nov. 17, 1881	
Saint Cyr, J. B.	Montreal, Que.	Feb. 17, 1887	
Saint Cyr, A.	Ottawa, Ont.	" 17, 1887	
Saunders, B. J.	Edmonton, Alta.	Nov. 16, 1884	
Scott, W. A.	Galt, Ont.	Mar. 19, 1909	
Seagar, E.	Kenora, Ont.	April 14, 1872	
Selby, H. W.	Toronto, Ont.	Nov. 15, 1882	
Seymour, H. L.	Edmonton, Alta.	Feb. 22, 1906	
Sewell, H. de Q.	Toronto, Ont.	May 16, 1885	
Shaw, C. A. E.	Victoria, B.C.	" 10, 1880	
Shepley, J. D.	Maple Creek, Sask.	Mar. 12, 1906	
Smith, C. C.	Ottawa, Ont.	Feb. 22, 1906	Dominion Observatory, Dept. of Interior.
Speight, Thos.	Toronto, Ont.	Nov. 16, 1882	
Starkey, S. M.	Starkey's P.O., N.S.	April 14, 1872	
Steele, I. J.	Ottawa, Ont.	" 16, 1908	
Stewart, G. A.	Calgary, Alta.	" 14, 1872	Dominion Topographical Surveyor, Professor of Surveying, School of Practical Science.
Stewart, L. B.	Toronto, Ont.	Nov. 22, 1882	
Stewart, E.	Montreal, Que.	April 14, 1872	
Stewart, W. M.	Hamilton, Ont.	June 6, 1907	
Talbot, A. C.	Calgary, Alta.	May 13, 1880	
Taylor, A.	Not known	June 9, 1904	
Teasdale, C. M.	Concord, Ont.	Mar. 9, 1906	
Thompson, W. T.	Fort Qu'Appelle, Sask.	Nov. 19, 1877	Dominion Topographical Surveyor. City Engineer, Vancouver.
Tracy, T. H.	Vancouver, B.C.	April 14, 1872	
Tremblay, A. J.	Les Eboulements, Que.	Feb. 18, 1890	
Turnbull, T.	Winnipeg, Man.	Mar. 29, 1882	
Tyrell, J. W.	Hamilton, Ont.	Feb. 16, 1887	
Vaughan, J. W.	Vancouver, B.C.	June 11, 1878	
Vicars, J.	Kamloops, B.C.	May 17, 1886	
Waddell, W. H.	Hamilton, Ont.	Mar. 25, 1907	
Waldron, J.	Moosejaw, Sask.	April 2, 1907	
Walker, E. W.	Regina, Sask.	Mar. 27, 1907	Dept. of Public Works for Saskatchewan.
Wallace, J. N.	Calgary, Alta.	Feb. 20, 1900	
Warren, J.	Walkerton, Ont.	April 14, 1872	
Watt, G. H.	Prince Albert, Sask.	Feb. 24, 1902	
Weekes, A. S.	Edmonton, Alta.	" 11, 1892	
Weekes, M. B.	Regina, Sask.	" 18, 1903	Dept. of Public Works for Saskatchewan.
Wheeler, A. O.	Calgary, Alta.	Nov. 21, 1882	
White-Fraser, G. W. R.	Ottawa, Ont.	Feb. 21, 1888	
Wiggins, T. H.	Saskatoon, Sask.	" 18, 1896	
Wilkins, F. W.	Norwood, Ont.	May 18, 1881	Dominion Topographical Surveyor.
Wilkinson, W. D.	Not known.	Feb. 22, 1893	
Williams, G. L.	Vancouver, B.C.	June 24, 1908	
Woods, J. E.	Frank, Alta.	Nov. 14, 1885	
Young, W. B.	Winnipeg, Man.	Mar. 25, 1905	
Young, W. H.	Lethbridge, Alta.	May 17, 1907	

## APPENDIX No. 12.

## EXAMINATION PAPERS OF THE BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

FEBRUARY, 1909.

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—FULL PRELIMINARY.

## XXXIII.

*February 9 to 12, 1909*

## PENMANSHIP AND ORTHOGRAPHY.

*(Time, 3 hours.)*

Marks

Write out the following, correcting the errors in spelling:—

Their ar kaisses in witch we rekkun withe thee moast unfaileing konfidents  
 up on yewneformitie, and uther kaisses in witch wee do knot kownt on itt at  
 awl. In sum, we feal komplet asurants that the fewtur will rezembel the passed,  
 the unnoan bee presislie simmiler to the noan. In uthers, howevver invairyabel  
 neigh bee the rezult obtained from the instanses witch we have observt, we draw  
 from them know moar than a verry feabel pressumshun that th lyk reezult will  
 hould in awl uther kaisses. That a strait lyne iz the schortesd disstants between  
 two poynee. We do knot dowte to bee trew eavin in the reejun off the ficksed  
 starrs. Wen a kemmist anowns the eggssistents and propperties of a knewlie  
 diskuvered substans, if we konfyde in his akurasie we feal asured that the  
 konklewshuns he haz ariyt at will howld universelly, altho the indukshun be  
 fownded but on a singel instans. We do knot withoald our ascent wayting four  
 v reppitishun of the eggsperrymeant; or if we doo, it iz fromm a dowte weather  
 the wun egsperrymeant waz propparly maid not wether if propperly maid it wood  
 bee konklewsif. Hear then iss a jennarel law of naityure, inferd withou'  
 hezetaishon from a singgel instans; ann yewniversel proppossishun from a  
 singgeler wun. Now marqu anuther kaisse, and kontrasst it with thiss. Knot  
 awl the instences witch have bin obzervt sints the beggining of the world, in  
 support of the jenarel proppossishun that awl kroaz are blak wood bee deamt a  
 sufishent presumshun of the trewth of the proppossishun, to outway the  
 tesstemoney of wun unexpectionable wittnes who shud afirm that in sum reejun  
 of the erth knot fully egsploured hee had kawt and egzammit a kro, and had  
 fownt it to be gra.

{	50
	200

SESSIONAL PAPER No. 25b

## ARITHMETIC AND LOGARITHMS.

(Time, 3 hours.)

Marks

- |  |    |
|--|----|
| 1. Find the least number which when divided by 4 has remainder 3; when by 10, remainder 9; when by 14, remainder 13; when by 15, remainder 14; and when by 21, remainder 20.   | 13 |
| 2. A vessel has three outlets, A, B and C. By A alone it may be emptied in 5 hours, by B in 7 hours, while C will empty it in two-thirds of the time which A and B acting together require. In what time can the vessel be emptied by the three taps together? | 13 |
| 3. Find (without using logarithms) the square root of $\frac{1.28}{12.5}$ , and the cube root of $405\frac{28}{125}$ .   | 14 |
| 4. Find the angles for<br>$\log \sin = 9.6234562$<br>$\log \tan = 0.2345678$<br>$\log \sec = 0.3148923$  | 15 |
| 5. Find the value of<br>$(\frac{1}{3})^{\frac{1}{2}} - (\frac{1}{3})^{-\frac{1}{2}} + (\frac{5}{6})^{\frac{1}{2}} - (\frac{1}{2})^{\frac{1}{2}}$   | 15 |
| 6. Find $\log \sin 92^\circ 13' 53''$<br>$\log \cos 104^\circ 15' 38''$<br>and $\log \tan 65^\circ 17' 33''$ .   | 15 |
| 7. Find the numerical value of<br>$\sin A + \cos B + \sec C$ , when<br>$A = 52^\circ 13' 15''$ ; $B = 118^\circ 20' 36''$<br>$C = 82^\circ 17' 19''$ .   | 15 |

## ALGEBRA.

(Time, 3 hours.)

- |   |    |
|---|----|
| 1. Factor $2b^2c^2 + 2c^2a^2 + 2a^2b^2 - a^4 - b^4 - c^4$ .   | 12 |
| 2. Find the H.C.F. of $x^4 - px^3 + px^2 - p^2x$ and $x^3 - p^3$ .  | 12 |
| 3. Find the L.C.M. of $x^2 - (a+b)x + ab$ , $x^2 - (b+c)x + bc$ , and $x^2 - (c+a)x + ca$                   | 12 |
| 4. Simplify $\frac{a-b}{a+b} + \frac{b-c}{b+c} + \frac{c-a}{c+a} + \frac{(a-b)(b-c)(c-a)}{(a+b)(b+c)(c+a)}$ | 12 |
| 5. Solve the simultaneous equations,<br>$3x + 4y + z = 22$<br>$7x - 9y + 8z = 19$<br>$2x + y - 4z = -9$     | 13 |
| 6. Solve<br>$\sqrt{\frac{x-4}{x-3}} + \sqrt{\frac{x+3}{x+4}} = \sqrt{\frac{7}{x^2+x-12}}$                   | 13 |
| 7. Solve $x^3 + y^3 + z^3 = x^2 + y^2 + z^2 = x + y + z = 1$ .  | 13 |
| 8. Solve<br>$x^{\frac{1}{n}} + x^{-\frac{1}{n}} = \frac{5}{2}$  | 13 |

## PLANE GEOMETRY

## FIRST PAPER.

(Time, 3 hours.)

	Marks.
1. Define a triangle. How many kinds of triangles are there according to the variation both of the angles and of the sides ?	12
2. Construct a triangle of which the sides shall be equal to three given straight lines.	13
3. What limitation is there as regards the lengths of the given straight lines in the last question? Is there a similar limitation with regard to the angles?	12
4. Equal triangles upon equal bases in the same straight line, and towards the same parts, are between the same parallels.	13
5. If a straight line be bisected and produced to any point, the rectangle contained by the whole line thus produced and the part of it produced, together with the square on half the line bisected, is equal to the square on the straight line which is made up of the half and the part produced.	13
6. State the algebraic proposition corresponding to the geometrical one in question 5, and enunciate Euclid's propositions corresponding to the algebraic ones	
$(a + b)^2 + (a - b)^2 = 2 a^2 + 2 b^2$ $4 ab + (a - b)^2 = (a + b)^2$	12
7. In every triangle the square on the side subtending either of the acute angles is less than the squares on the sides containing that angle by twice the rectangle contained by either of these sides and the perpendicular let fall upon it from the opposite angle	13
8. If two circles cut one another they shall not have the same centre.	12

## PLANE GEOMETRY.

## SECOND PAPER

(Time, 3 hours.)

	Marks.
9. A segment of a circle being given, describe the circle of which it is the segment.	12
10. In a circle the angle in a semicircle is a right angle; but the angle in a segment greater than a semicircle is less than a right angle; and the angle in a segment less than a semicircle is greater than a right angle.	13
11. What are the angles in the segments cut off by an inscribed regular pentagon? What part of the whole circumference is the arc of a segment containing half a right angle?	12

SESSIONAL PAPER No. 25b

- |   |    |
|---|----|
| 12. Describe an isosceles triangle having each of the angles at the base double of the third angle.   | 13 |
| 13. In a given circle inscribe an equilateral and equiangular quindecagon.  | 12 |
| 14. Give Euclid's criterion of proportionality.   | 12 |
| 15. Similar triangles are to one another in the duplicate ratio of their homologous sides.  | 13 |
| 16. In equal circles, angles, whether at the centres or circumferences, have the same ratio which the circumferences on which they stand have to one another; so also have their sectors. | 13 |

PLANE TRIGONOMETRY.

(Time, 3 hours.)

- |  | Marks. |
|--|--------|
| 1. In any triangle, prove the formulæ<br>$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $a \cos B + b \cos A = c.$ | 14     |
| 2. Prove that $\sin 3A = 3 \sin A - 4 \sin^3 A$ .  | 14     |
| 3. Given $a = 35 \cdot 3$ , $b = 54 \cdot 7$ , $A = 33^\circ 25'$ , solve the triangle                                       | 18     |
| 4. Given $b = 17 \cdot 34$ , $c = 29 \cdot 85$ , $A = 125^\circ 43'$ ; find $a$ .  | 18     |
| 5. Given $A = 25^\circ 33'$ , $B = 117^\circ 08'$ , $a = 125 \cdot 33$ ; find $c$ .  | 18     |
| 6. Given $a = 23 \cdot 5$ , $b = 37 \cdot 7$ , $c = 31 \cdot 2$ ; find the angles.   | 18     |

SPHERICAL TRIGONOMETRY.

(Time, 3 hours.)

- |  | Marks. |
|--|--------|
| 1. What is meant by the polar triangle? What is the relation between the sides and angles of a spherical triangle and those of the corresponding polar triangle? | 20     |
| 2. Given $c = 145^\circ$ ; $a = 25^\circ$ ; $C = 90^\circ$ , solve the triangle.   | 20     |
| 3. Given $b = 123^\circ 15'$ ; $c = 135^\circ 10'$ ; $A = 15^\circ 27'$ , find $a$ .   | 20     |
| 4. Given $B = 140^\circ 10'$ ; $C = 55^\circ 42'$ ; $a = 63^\circ 26'$ , find $A$ .  | 20     |
| 5. Given $A = 125^\circ$ ; $B = 135^\circ$ ; $c = 85^\circ$ , find $a$ .   | 20     |

## MENSURATION.

(Time, 3 hours.)

Marks.

1. The sides of a triangular field are 10.36, 12.42 and 14.82 chs. What is its area? 17
2. What part of the surface of the earth lies between the parallels of  $30^\circ$  and  $60^\circ$  north latitude? 17
3. A right cone with base 36 feet in circumference and 10 feet high is cut by a plane parallel to the base so that the surface of the lower part is five times that of the upper. What is the height of the truncated cone? 17
4. A test of the chain used in making the measurements noted in question 1 having shown the chain to be half a link too short, what is the corrected area of the field? 16
5. The edge of a regular tetrahedron is 36 inches. What is the diameter of the sphere having the same surface as the tetrahedron? 17
6. A circular half mile race track is 30 feet wide; the half mile line is 3 feet from the inner limit of the track. How many acres are covered by the track? 16

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—LIMITED PRELIMINARY.

## XXI.

February 9, 1909.

FIRST PAPER.

(Time, 3 hours.)

Marks.

1. Penmanship and Orthography. (Same as in Full Preliminary Examination.) 50  
200
2. The eagle weighs 258 grains, nine-tenths pure gold; 1869 sovereigns weigh 480 ounces Troy, eleven-twelfths pure gold. Find the value of the sovereign in terms of the dollar. 50
3. If  $x^3 + px^2 + qx + r$  vanish for  $x = a$ , or  $= b$ , or  $= c$ , determine  $p$ ,  $q$ , and  $r$  in terms of  $a$ ,  $b$ ,  $c$ . 50
4. If  $\frac{a+b}{3(a-b)} = \frac{b+c}{4(b-c)} = \frac{c+a}{5(c-a)}$  prove that  $32a + 35b + 27c = 0$ . 50
5. A ladder is gradually raised against a wall; find the locus of its middle point. 50
6. In a triangle, prove that the area  

$$= \sqrt{s(s-a)(s-b)(s-c)}$$
where  $s = \frac{1}{2}(a+b+c)$  50
7. If  $\tan^2 A = 1 + 2 \tan^2 B$ , then will  $\cos 2B = 1 + 2 \cos 2A$ . 50
8. Prove that, in equal circles, angles at the centre are proportional to the arcs on which they stand. 50

## SESSIONAL PAPER No. 25b

## SECOND PAPER.

(Time, 3 hours.)

	Marks.
9. If $O$ be the centre of the circumscribed circle of the triangle $ABC$ , and $AO$ meet $BC$ in $D$ , $DO:AO=\cos A:\cos (B-C)$ .	50
10. If the surface areas of a sphere, a cube and a regular tetrahedron be each 36 square feet, find the lengths of the diameter of the sphere, and the edges of the cube and tetrahedron.	50
11. Prove that in equal circles the angles at the centre are proportional to the arcs on which they stand.	50
12. Find the locus of a point whose distances from two given points are in a given ratio.	50
13. Given $b=99^\circ 41'$ ; $c=100^\circ 50'$ ; $A=65^\circ 33'$ , find $a$ .	50
14. Given $c=75^\circ 31'$ ; $a=90^\circ$ ; $B=30^\circ 53'$ , find the other parts.	50
15. Find the value of $(\frac{23}{31})^{\frac{3}{4}} + (\frac{13}{17})^{-\frac{5}{2}} + (\frac{3}{4})^{\frac{2}{3}} - (\frac{28}{39})^{-\frac{1}{2}}$	50

## FINAL EXAMINATION FOR DOMINION LAND SURVEYOR.

## XLI.

February 9 to 16, 1909.

## PENMANSHIP AND ORTHOGRAPHY.

(Time, 3 hours.)

The same paper as in the Full Preliminary Examination.

Marks.

{ 50
{ 200

## ALGEBRA.

(Time, 3 hours.)

Marks.

- |   |    |
|---|----|
| 1. Find the $H. C. F.$ and $L. C. M.$ of<br>$20x^4 + x^2 - 1, 25x^4 + 5x^3 - x - 1, 25x^4 - 10x^2 + 1.$   | 10 |
| 2. Resolve $9x^6y^2 - 576y^2 - 4x^8 + 256x^2$ into six factors.   | 10 |
| 3. Multiply<br>$\sqrt{2x} + \sqrt{2(2x-1)} - \frac{1}{\sqrt{2x}}$ by $\frac{1}{\sqrt{2x}} + \sqrt{2(2x-1)} - \sqrt{2x}$   | 10 |
| 4. If $p$ be the difference between any quantity and its reciprocal, $q$ the difference between the square of the same quantity and the square of its reciprocal, show that $p^2(p^2 + 4) = q^2.$ | 10 |
| 5. Extract the square root of $7 - 30\sqrt{-2}.$  | 10 |
| 6. Given that 4 is the root of the quadratic $x^2 - 5x + q = 0$ , find the value of $q$ and the other root.   |    |

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7. What is the amount of  $a$  dollars, in  $b$  years at  $c$  per cent compound interest? 10
8. (1) Given  $\log 2 = .301030$ ,  $\log 3 = .477121$  and  $\log 7 = .845098$ , find the logarithm of .005, 6.3, and  $\left(\frac{49}{216}\right)^{\frac{1}{3}}$  10
- (2) Find  $x$  from the equation  $\frac{8-4x}{18} = \left(54\sqrt{2}\right)^{3x-2}$
9. If  $a, b$  are the roots of  $x^2 + px + q = 0$ , show that  $p, q$ , are the roots of the equation  $x^2 + (a+b-ab)x - ab(a+b) = 0$ . 10
10. A lawn 50 ft. long and 34 ft. broad has a path of uniform width around it; if the area of the path is 540 square ft., find its width. 10

## PLANE GEOMETRY.

(Time, 3 hours.)

- |  | Marks. |
|--|--------|
| 1. In a right-angled triangle, prove $c^2 = a^2 + b^2$   | 18     |
| 2. In any triangle prove $c^2 = a^2 + b^2 - 2ab \cos C$ .  | 18     |
| 3. Find a point at which each of two given finite straight lines subtends a given angle.   | 19     |
| 4. The locus of a point from which tangents drawn to two given circles are equal, is a straight line   | 19     |
| 5. If two chords of a circle when produced intersect at a point without a circle, the rectangle contained by the segments of one chord is equal to the rectangle contained by the segments of the other chord.                             | 19     |
| 6. If a straight line be drawn through a given point to cut a given circle, the intersection of the tangents at the two points of section always lies on a fixed straight line.  | 19     |
| 7. If an angle of a triangle be bisected internally and externally by a straight line which cuts the opposite side or that side produced, the ratio of the segments of that side is equal to the ratio of the other sides of the triangle. | 19     |
| 8. If three straight lines be drawn from the vertices of a triangle meeting in a point and cutting the opposite sides or the sides produced, the ratio compounded of the ratio segments of the sides taken in order is equal to unity.     | 19     |

## SOLID GEOMETRY.

(Time, 3 hours.)

- |   | Marks |
|---|-------|
| 1. Name the regular solids, and give the number of faces, corners and edges for each.           | 8     |
| 2. If two straight lines are cut by three parallel planes, they will be divided proportionally. | 8     |



SESSIONAL PAPER No. 25b

3. The sum of any two of the plane angles formed by the edges of a trihedral angle, is greater than the third. 8
4. The sum of the plane angles of a trihedral angle is less than four right angles. 8
5. A cube, a tetrahedron and a sphere have each the same surface,  $S$ . Find side, edge and diameter respectively; also the volume of each. 8
6. If the mean density of the earth is 5.56, what will be the mean density when the diameter contracts ten per cent? 8
7. Into a cylindrical vessel 10 inches wide and 20 inches deep, filled with water are placed an iron ball 8 inches in diameter, and a wooden cylinder, specific gravity .7, seven inches in diameter and seven inches long. How many gallons of water will be displaced, taking 10 lbs. to the gallon, and 62.5 lbs. to the cubic foot of water? 9
8. What is the angle subtended by the developed arc of the tangent cone, tangent to the earth at latitude  $45^\circ$ ? 9
9. A sphere is placed in water; it is found that one-third of its surface is above the water. What is the specific gravity of the sphere? 9

SPHERICAL TRIGONOMETRY.

(Time, 3 hours).

- |  | Marks. |
|--|--------|
| 1. Deduce the fundamental equations.   |        |
| (1) $\cos a = \cos c \cos b + \sin c \sin b \cos A$ .  |        |
| (2) $\sin a \cos B = \sin c \cos b - \cos c \sin b \cos A$ .                                     |        |
| (3) $\sin a \sin B = \sin b \sin A$ .  | 25     |
| 2. Prove Napier's analogies.   | 20     |
| 3. Given $a = 120^\circ$ , $b = 70^\circ$ , $A = 130^\circ$ , find $C$ and $B$ .                 | 20     |
| 4. Given $A = 80^\circ 10' 30''$ , $b = 155^\circ 46' 42''$ , $C = 90^\circ$ Solve the triangle. | 20     |
| 5. Show that $\sin \frac{1}{2} A = \sqrt{\frac{\sin(s-b) \sin(s-c)}{\sin b \sin c}}$ .           | 20     |
| 6. Given $A = 120^\circ$ , $B = 130^\circ$ , $C = 80^\circ$ , find $c$ .                         | 20     |

MEASUREMENT OF AREAS AND SUBDIVISION OF LAND.

FIRST PAPER.

(Time, 3 hours).

- |   | Marks. |
|---|--------|
| 1. What is the latitude of the parallel that bisects the area of the north temperate zone, taking the limits of the zone at $23^\circ 30'$ and $66^\circ 30'$ ? | 16     |
| 2. Taking the mean parallax of the sun as $8''.8$ , what fractional part of the sun's radiation is intercepted by the earth?                                    | 16     |

3. In a quadrilateral  $ABCD$  the sides are respectively  $AB=8$  chs.,  $BC=9$  chs.,  $CD=6$  chs., and  $DA=8$  chs, the diagonal  $DB=14$  chs. Required to divide it into three equal parts by two straight lines drawn from  $A$ . 17
4. To divide a triangular field into two parts in a given ratio  $m:n$  by the shortest line. 17
5. The centre line of a railway runs off on a curve of 2,000 ft. radius from a tangent, N.  $30^\circ$  E. at its intersection with the west limit of S. 34, T 23, R. IV W. of 3rd M., 12 chs. south of the N. W. corner of the section. The centre of the curve is in S 34. The right of way extends 50 ft. on each side of the centre line. What is the area of that part of the N. W.  $\frac{1}{4}$  section lying north of the railway? 17
6. What is the area enclosed by the half mile line of a race track; the half mile line being composed of two tangents making an angle of  $60^\circ$  with each other, and of an arc of a circle? 17

MEASUREMENT OF AREAS AND SUBDIVISION OF LAND

SECOND PAPER.

(Time, 3 hours.)

Marks.

7. The following are the notes of a survey of a quadrilateral piece of land:
- 1. N.  $52^\circ 00'$  E.. . . . . 10.63 chs.
  - 2. S.  $29^\circ 45'$  E.. . . . . 4.10 "
  - 3. S.  $31^\circ 45'$  W.. . . . . 7.69 "
  - 4. N.  $61^\circ 00'$  W.. . . . . 7.13 "

Find the area by the method of Latitudes and Departures, first balancing the survey. 40

8. Express the conditions necessary for a closed survey by two equations:  
(a) And from them show what missing data in a survey can be supplied.  
(b) How does the supplying of missing data in a survey affect "balancing" the survey? 20
9. Give full explanation and deduction of the method of computing areas by "latitudes and departures," using a figure of not less than four sides. 20
10. If, in question 7, the supposed position of the north point was in error 15 minutes, and the chain was a link too short; what is the true area of the quadrilateral? 20

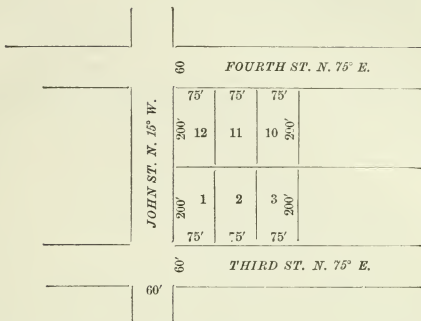
SESSIONAL PAPER No. 25b

## DESCRIPTIONS.

(Time, 3 hours.)

Marks.

1.



The above is part of the registered plan of the town of Holly in the County of Tweed and Province of Alberta. *A* sells to *B* a part of lot No. 1 and adjoining John and Third streets. The part sold is to have a frontage of forty feet on Third street to extend to the rear of the lot and the dividing line to be parallel to John street. Make a description for a deed.

2. Using the plan of question 1. Supposing *A* to own lots Nos. 1 and 2, he sells lot No. 2 to *B*, and gives the right of ingress and egress to *B* by a lane, 16 feet wide, running along the whole of the rear limit of lot No. 1. Make the necessary description for the conveyance.
3. Moose Creek flows across the N.E.  $\frac{1}{4}$  S. 12, T. 13, R. 15 W. in an easterly direction. *B* desires to buy the northerly part of the quarter section lying north of the creek, together with the creek. From measurement the southerly bank of the creek intersects the eastern and western quarter section lines respectively at 22<sup>ch</sup>. 12 and 20<sup>ch</sup>. 18 from the northern quarter section line. The whole area to be conveyed is supposed to contain 85 acres. Make a description for a deed.
4. Make a description for the remaining part of the quarter section given in question 3.

## ASTRONOMY.

## FIRST PAPER.

(Time, 3 hours.)

Marks.

1. Define—declination, right ascension, celestial latitude and longitude, first point of Aries; parallactic angle; dip, parallax, and elongation.
2. Explain fully the equation of time, why it varies, and when it is a maximum. A diagram is desirable.

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- |   |    |
|---|----|
| 3. In latitude $45^{\circ} 25' N.$ , longitude $75^{\circ} 42' W.$ , what is the standard time on March 31, 1904, of eastern elongation of Polaris? | 13 |
| 4. At same place and date as above what is the standard time of sunset? Semi-diameter, refraction and parallax to be considered.                    | 13 |
| 5. At same date and place as above what is the apparent altitude of Polaris at lower transit?   | 12 |
| 6. At same place what is the limit in declination of stars that can be observed on the prime vertical.  | 12 |
| 7. At same place the apparent altitude of a star on the prime vertical was $37^{\circ} 08' 30''$ , what was its declination?                        | 12 |
| 8. In the last question what was the altitude of that star when its hour angle was 3h. 30m.?  | 12 |

## ASTRONOMY.

## SECOND PAPER.

*(Time, 3 hours.)*

- |   |        |
|---|--------|
|   | Marks. |
| 9. On July 12, 1904, on the 4th Base Line R. X., XI, W. of 3rd M., the observed altitude of the sun's lower limb at $8^h 20^m 15^s$ watch time was $42^{\circ} 28' 15''$ . What was the watch correction, and what was the azimuth of the sun?  | 20     |
| 10. In question 9, what was the true local sidereal time of observation?  | 20     |
| 11. At mean noon on July 12, 1904, in Longitude $90^{\circ} W.$ a sidereal chronometer is slow $13^s.56$ on local sidereal time and has a daily rate, gaining, of $1^s.96$ ; while at another place to the West at the same time, a mean time chronometer is fast $18^s.96$ on local mean time and has a losing rate daily of $1^s.62$ . Ten days later at mean noon of the former place the two chronometers are compared by telegraph and found to differ by $8^h 38^m 57^s.62$ . What is the difference of longitude between the two places? | 20     |
| 12. At the same place and date as in question 9, at what standard time will Sirius rise?  | 20     |
| 13. On June 30, 1904, the altitude of the upper limb of the sun at its lower or northern culmination was $11^{\circ} 15' 20''$ . What was the latitude of the place?  | 20     |

## MANUAL OF SURVEY AND DOMINION LANDS SURVEYS ACT.

## FIRST PAPER.

*(Time, 3 hours.)*

- |   |        |
|---|--------|
|   | Marks. |
| 1. Where is the Coast Meridian?   | 4      |
| 2. What are the differences between the third and the fifth systems of survey?                                      | 4      |
| 3. Define a bearing and an azimuth.   | 15     |
| 4. To what meridian is a bearing referred in subdividing a township and how is it deduced from an observed azimuth? | 11     |

## SESSIONAL PAPER No. 25b

- |  |    |
|--|----|
| 5. How is the deficiency or surplus along meridians disposed of between the first and the second base lines?   | 5  |
| 6. What is to be done when the survey line is obstructed by a pond, lake, deep marsh or other obstacle?  | 5  |
| 7. In surveying a meridian in the interior of a township, the surveyor strikes the outline one chain and twenty links from the corner; what must he do?        | 6  |
| 8. The lines around a block of two sections do not close within fifty links; what must the surveyor do?  | 6  |
| 9. In what cases is it necessary for a subdivider to run twice the northern limit of a section in the interior of a township?                                  | 6  |
| 10. Describe the monuments at a quarter section corner in prairie and at a section corner on a correction line in the woods; also a witness post and trench.   | 15 |
| 11. How is a settlement surveyed?  | 13 |
| 12. By what considerations is a surveyor to be guided in deciding whether a road allowance shall or shall not be left along the boundary of an Indian Reserve? | 5  |
| 13. What are the objects of the traverses made in subdividing Dominion lands?  | 5  |

## MANUAL OF SURVEY AND DOMINION LANDS SURVEYS ACT.

## SECOND PAPER.

*(Time, 3 hours.)*

- |   | Marks. |
|---|--------|
| 14. Describe the method to be followed in making traverses.   | 6      |
| 15. Define the bank and the bed of a body of water.   | 8      |
| 16. When a parcel of land is bounded by a body of water and the water recedes, does the new land belong to the owner of the parcel? | 8      |
| 17. How are shallow lakes or marshes dealt with?  | 8      |
| 18. Give the marks on the following posts:  |        |
| (a) At the corner between sections 8, 9, 16 and 17, township 99, range 14, East of the Principal Meridian.                          |        |
| (b) At the southerly corner between sections 26 and 27, township 87, range 17, West of the Fourth Meridian.                         |        |
| (c) At the north easterly corner of section 31, township 114, range 24, West of the Fifth Meridian.                                 |        |
| (d) At the northerly corner of township 94, range 14, West of the Third Meridian.   |        |
| (e) At the witness mound placed 8 chains north of the S.E. corner of section 15, township 43, range 9, West of the Second Meridian. | 20     |
| 19. Define a resurvey, a retracement, a restoration survey, an obliterated corner, and a lost corner.                               | 8      |
| 20. Explain how a surveyor must proceed in order to compel the attendance of persons who have information as to boundaries.         | 6      |



SESSIONAL PAPER No. 25b

## PLANE AND SPHERICAL TRIGONOMETRY.

(Time 3 hours.)

	Marks.
1. Sum to infinity $2 \cos \theta + \frac{3}{2} \cos^2 \theta + \frac{4}{3} \cos^3 \theta + \frac{5}{4} \cos^4 \theta + \dots$	8
2. To find $K$ and $Z$ from the equations $K \sin (a+Z)=m$ $K \sin (\beta+Z)=n$	8
3. Develop the sine and cosine of the multiple angle in a series of ascending powers of the tangent of the simple angle.	8
4. Required the increase of $\log \sin \theta$ arising from $\theta$ receiving a small increment, $\delta \theta$ .	8
5. In a spherical triangle, given $a$ , $b$ and $A$ , determine by inspection whether there are two solutions or but one.	8
6. Give the three fundamental equations for the general spherical triangle.	8
7. In a spherical triangle if $C$ and $c$ remain constant while $a$ and $b$ receive the small increment $\delta a$ and $\delta b$ respectively, show that $\frac{\delta a}{\sqrt{(1-n^2 \sin^2 a)}} + \frac{\delta b}{\sqrt{(1-n^2 \sin^2 b)}} = 0 \text{ where } n = \frac{\sin C}{\sin c}$	9
8. Find the locus of the vertex of a spherical triangle of given base and area.	9
9. Deduce Legendre's Theorem: If the sides of a spherical triangle are very small compared with the radius of the sphere, and a plane triangle be formed whose sides are equal to those of the spherical triangle, then each angle of the plane triangle is equal to the corresponding angle of the spherical triangle minus one-third of the spherical excess.	9

## ANALYTICAL GEOMETRY.

(Time, 3 hours.)

Two dimensions.

	Marks.
1. Find the area of the triangle, the co-ordinates of whose angular points are 4, 5; 3, 7; 2, 8. Rectangular axes.	10
2. Find the condition that the lines $y = m_1 x + c_1$ and $y = m_2 x + c_2$ may be at right angles, $a$ being the angle between the axes of co-ordinates.	10
3. If $u = 0$ , $v = 0$ , $w = 0$ , be the equations to three straight lines, prove that $lu + mv + nw = 0$ . ( $l$ , $m$ and $n$ being constants) represents a straight line, and that by giving suitable values to $l$ , $m$ and $n$ , it may in general be made to represent any straight line whatever.	10
4. If $S = 0$ , $S_1 = 0$ , be the equations of two circles in the form $(x-a)^2 + (y-b)^2 - r^2 = 0$ , what does $S - S_1 = 0$ represent, and what is the distinctive property of this curve?	10

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5. Find the locus of the feet of the perpendiculars drawn from the foci of an ellipse upon any tangent to the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ , and if  $p, p_1$  represent the lengths of these perpendiculars find the value of the product  $p p_1$  in terms of  $a$  and  $b$ . 10

*Three dimensions.*

6. Find the angle between the line  $\frac{x}{2} = \frac{y}{\sqrt{3}} = \frac{z}{\sqrt{2}}$ , and the line 10

$$\frac{x}{\sqrt{3}} = y, z = 0. \text{ Axes rectangular.}$$

7. Find the equation of the plane which passes through the origin and through the line of intersection of the planes 10

$$Ax + By + Cz = D \text{ and}$$

$$A_1x + B_1y + C_1z = D_1;$$

and determine the condition that it may bisect the angle between them

8. Investigate the conditions necessary in order that the equation 10  
 $ax^2 + by^2 + cz^2 + 2a_1yz + 2b_1zx + 2c_1xy = 0$   
 may represent two planes.

9. Prove that the sections of an ellipsoid by parallel planes are similar ellipses. 10

10. If  $R$  be the radius of curvature at a point  $P$  of the meridian of a spheroid of revolution,  $N$  that of a section of the surface through  $P$  perpendicular to the meridian, find the radius of curvature of a section through  $P$  making an angle  $\theta$  with the meridian. 10

## DESCRIPTIVE GEOMETRY AND PROJECTIONS.

*(Time, 3 hours.)*

Marks.

- |  |    |
|--|----|
| 1. Determine the traces of a plane which shall contain a given point and be perpendicular to a given line.   | 9  |
| 2. Draw the projection of a cube $2\frac{1}{2}''$ edge when resting with one edge on the horizontal plane, that edge making an angle of $30^\circ$ with the ground line, and a face containing it inclined at $40^\circ$ .                 | 9  |
| 3. Assuming the earth to be spherical, find by a graphical construction the distance between two points, one in latitude $10^\circ$ North and the other one in latitude $24^\circ$ South, their difference of longitude being $76^\circ$ . | 12 |
| 4. Construct the perspective of a rectangular pyramid of which the base is on the ground plane, the sides of the base making angles of $20^\circ$ and $70^\circ$ with the picture plane.   | 12 |
| 5. Describe the zenithal projection by balance of errors (Airy's).   | 20 |
| 6. Draw the meridians and parallels, five degrees apart, of a gnomonic projection having its centre in latitude $45^\circ$ and extending $15^\circ$ in latitude and longitude from the centre.   | 13 |

NOTE.—Draw the figures correctly in pencil with compass and protractor.



SESSIONAL PAPER No. 25b

# DIFFERENTIAL AND INTEGRAL CALCULUS

(Time 3 hours.)

Marks.

1. Deduce from first principles the differential co-efficients with respect to  $x$  of  $e^x$ ,  $\sin^{-1}x$ ,  $\log (x + \sqrt{1-x^2})$  10
2. Differentiate  $\log \left\{ \frac{2x-1+2\sqrt{x^2-x-1}}{\cos^{-1} \frac{3+5 \cos x}{5+3 \cos x}} \right\}$  10
3. Expand in ascending powers of  $x$  to five terms,  $\log \tan \left( \frac{\pi}{4} - x \right)$  10
4. If  $u$  is a function of  $x$  and  $y$  prove that  $\frac{d}{dx} \left( \frac{du}{dy} \right) = \frac{d}{dy} \left( \frac{du}{dx} \right)$  and that when  $u$  is a homogeneous function of  $x$  and  $y$  of the  $n^{\text{th}}$  degree  $x \frac{du}{dx} + y \frac{du}{dy} = nu$ . 10
5. Within an angle  $BAC$  a point  $P$  is given, through which it is required to draw a straight line so that the triangle cut off by it shall be the smallest possible. Prove that this line will be bisected at  $P$ . 10
6. Find that point in an ellipse at which the angle contained between the normal and the line drawn to the centre is a maximum. 10
7. Sum the series  $P_1 + \frac{1}{2} P_2 + \frac{1}{3} P_3 + \dots \dots \frac{1}{n} P^n$ , 10  
where  $\frac{1}{P_r} = \frac{n}{r} + \frac{r}{n}$ , when  $n$  is indefinitely increased.
8. Integrate  $\frac{dx}{x(1+x)^2(1+x+x^2)}$  10
9. Integrate  $e^{ax} \cos kx dx$  10
10. The equation of a curve being  $(x^2 + y^2)^2 = x^2 - y^2$ , find its area between the limits  $x=0$  and  $x=1$ . 10

# PROBABILITY AND LEAST SQUARES.

(Time, 3 hours.)

Marks

1. A bag contains 1000 balls numbered from 1 to 1000. One ball is drawn.  $A$ , who speaks the truth 9 out of 10 times, asserts that the ball drawn is number 257. What is the probability that  $A$ 's assertion is true? 15
2. A bag contains 1000 balls of which it is known that one only is white, and the rest are black. One ball is drawn.  $A$ , who speaks the truth nine out of ten times, asserts that the white ball is drawn. What is the probability of the truth of his assertion? 15

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3. A straight rod is divided at random at two points. What is the chance that a triangle may be formed having the three parts as sides? 20
4. On the assumption that the arithmetic mean of a number of measurements is the most probable value of the quantity sought, deduce the equation of the curve of probability of an error. 20
5. Two sides  $a$  and  $b$  of a triangle and the included angle  $C$  having been measured, with probable errors  $\alpha$ ,  $\beta$  and  $\gamma$  respectively;  $\alpha$  and  $\beta$  being expressed in terms of the unit of length and  $\gamma$  in seconds of arc; find the probable error of the area found by the formula  $\frac{1}{2} ab \sin C$ . 20
6. If  $m$  observations have been made of linear functions of  $n$  unknown quantities, ( $m > n$ ), derive the method of determining the most probable values of the unknowns. 20
7. Give a practical form of solution of the problem stated in question 6, showing how an arithmetical check may be applied. How may the weights of the resulting values of the unknowns be determined? 20
8. If at four points of a triangulation the horizontal angles between all the lines of the quadrilateral have been measured, show how the most probable corrections to the observed values may be obtained. How many independent conditions are there? 20

## GEODESY.

*(Time, 3 hours.)*

Marks.

1. What conditions must a surveyor fulfil in establishing a chain of triangles? In what cases must preference be given to particular systems? 20
2. Explain how horizontal angles are measured at a triangulation station. 15
3. What is trigonometrical levelling?  
Deduce the formulae for reciprocal but not simultaneous observations and expand them into series. 25
4. Deduce the value of the correction for phase.  
What data have to be recorded when this correction is required? 15
5. Explain the difference between an astronomical and a geodetic azimuth and give the expression for its value. 25
6. Deduce a formula for the area of a trapezoid formed by two meridians and two parallels, assuming the earth to be a spheroid. 25

## ASTRONOMY.

FIRST PAPER.

*(Time, 3 hours.)*

Marks.

1. Given the declination and the right ascension of a star, and the obliquity of the ecliptic, to find the latitude and longitude of the star. 16

SESSIONAL PAPER No. 25b

2. Given the following ephemeris of the moon, find the difference of the moon's right ascension in one minute for March 5, 0<sup>h</sup>. 16
- |       |    | h. |  | h. | m. | s     |
|-------|----|----|--|----|----|-------|
| March | 3, | 12 |  | 20 | 28 | 17.88 |
|       | 4, | 0  |  | 20 | 58 | 57.08 |
|       | 4, | 12 |  | 21 | 29 | 02.01 |
|       | 5, | 0  |  | 21 | 58 | 28.39 |
|       | 5, | 12 |  | 22 | 27 | 15.43 |
|       | 6, | 0  |  | 22 | 55 | 25.50 |
|       | 6, | 12 |  | 23 | 23 | 03.39 |
3. Discuss the effect of errors in the data upon the time computed from an altitude. 17
4. Discuss the method for determining latitude from observations on stars at the same altitude when the time is given. 17
5. Deduce formulæ for obtaining latitude by observing the sum of the azimuths of two stars at eastern and western elongation respectively; and discuss the same with reference to choice of stars dependent upon declination. 17
6. On February 12, 1906, in latitude 45° 25' N., longitude 75° 42' W., what was the standard time when  $\alpha$  and  $\beta$  Orionis were in the same vertical plane? 17
- |  |  |
|--|--|
| $\delta_{\alpha} = 7^{\circ} 23' \text{ N.}$ | $\alpha_{\alpha} = 5^{\text{h}} 50^{\text{m}}$ |
| $\delta_{\beta} = 8^{\circ} 19' \text{ S.}$  | $\alpha_{\beta} = 5^{\text{h}} 10^{\text{m}}$  |

ASTRONOMY.

SECOND PAPER.

(Time, 3 hours).

Marks.

7. Deduce the equations of the transit instrument in the meridian. 14
8. Give formulae for reduction of thread intervals; for level constant; for inequality of pivots; for collimation constant; for azimuth constant; and for daily aberration. 14
9. In Talcott's method for obtaining latitude deduce formula for 'reduction to the meridian.' 14
10. Give the formulae for deducing the mean place of a star from a given epoch to another; and also the formulae for reducing a star from mean to apparent place, explaining fully the meaning of the symbols used in the formulae. 14
11. In latitude 38° 59' N., longitude 5<sup>h</sup> 05<sup>m</sup> 57.5<sup>s</sup> W., the sun was observed at the same altitude A. M. and P. M. by a chronometer regulated to Greenwich mean time; the mean of the A. M. times was 1<sup>h</sup> 03<sup>m</sup> 26.6<sup>s</sup>, and the P. M. times 8<sup>h</sup> 45<sup>m</sup> 41.7<sup>s</sup>. Find the chronometer correction at noon, having given  $\delta = -5^{\circ} 46' 22.5''$ ,  $\Delta \delta = +58.10''$ , and equation of time = + 11<sup>m</sup> 35.11<sup>s</sup>. 14

12. Deduce formulae for reducing observations of the moon at culmination to the transit of the centre. 15
13. Give the method in full for reducing circum-meridian altitudes for the determination of latitude. 15

SYSTEM OF DOMINION LANDS SURVEYS; TOPOGRAPHICAL AND EXPLORATORY SURVEYS.

(Time 3 hours.)

Marks

1. Show derivation of formulae in the Manual for radius of curvature and normal to the meridian.

$$R = \frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$
$$N = \frac{a}{(1-e^2\sin^2\phi)^{\frac{1}{2}}}$$
$$\log(N\sin 1'') = \frac{1}{3}\log(R\sin 1'') + \frac{2}{3}\{(\log a + \log \sin 1'' + 2Mn)\}$$

where  $M$  is the modulus of the common system of logarithms, and  $n = \frac{a-b}{a+b}$ .

25

2. In observing for time in the vertical of Polaris, show derivation of formula

$$p = P \sin(t-t') + \frac{P^2}{2} \sin 2(t-t') \tan \delta,$$

where  $p$ =arc of great circle from the pole and perpendicular to above vertical;  $P$ =polar distance of Polaris,  $\delta$ =declination of time star;  $(t-t')=(a-a')-(T-T')$  in which  $T$  and  $T'$  are the chronometer times respectively of the time star and Polaris when observed, and  $a$  and  $a'$  their ascensions.

25

3. A Peace River Block in B.C. lies along the 120th meridian; its northern boundary is the 23rd Base Line, and its southern boundary, the 20th Base Line. The 23rd Base Line extends to the 122nd meridian, while the other Base Lines are of the same length. The Block is supposed to be surveyed under the Fourth System of Survey. What is its area and what is the distance from the western end of the 20th Base Line to the 122nd meridian?
- 25

4. In the above Block a straight line is run for 40 miles from the intersection of the 20th Base Line with the 120th meridian, and with an initial course of N. 25° W. Give the exact position of the end of the line with reference to section, township and range.
- 25

5. If the eastern boundary of Manitoba is extended by a line running from the N.E. corner of the province to the most easterly point of Island Lake, and thence by a straight line to the intersection of the 89th meridian with the shore of Hudson Bay; explain fully and lucidly the method, instruments employed and checks adopted for an exploratory survey prior to the definite location of the boundary.
- 25

6. (a) Compute the difference in latitude between the middle points of the chord and arc of a township side in latitude 49°.
- (b) What is the theoretical width of township 26 along the Correction Line and adjoining the 4th Initial Meridian to the East?
- 25

SESSIONAL PAPER No. 25b

## THEORY, CONSTRUCTION AND ADJUSTMENT OF INSTRUMENTS.

*(Time, 3 hours.)*

	Marks.
1. Describe the construction and adjustments of the registering transit micro-meter.	20
2. Explain the adjustments of the zenith telescope.	15
3. What is a collimator? How is it adjusted and what are the different purposes for which it is used?	20
4. Explain why two images of the same object cannot be made to coincide in the telescope of a sextant if the index glass is in perfect adjustment but the horizon glass is not perpendicular to the plane of the sextant. Explain also how it is possible that such coincidence may be secured if both the index and horizon glass are inclined. Why is it advisable to make certain of the index glass adjustment before adjusting the horizon glass?	25
5. Prove the law of extreme path for a single refraction of a ray of light.	25
6. Prove that in an achromatic combination of positive focal length consisting of two thin lenses, the lens with the smaller dispersive power has a positive focal length, the other lens having a negative focal length.	25
7. Prove that in a telescopic system the magnification is equal to the ratio of the entrance pupil to the exit pupil.	20

## GRAVITY AND TERRESTRIAL MAGNETISM.

*(Time, 3 hours.)*

	Marks.
1. Define acceleration, force, work, activity. What are their dimensions in terms of the units of length, mass, and time?	16
2. What is the difference between British units and C. G. S. units as used in measuring magnetic force? How is a force expressed in one set of units transformed to the other?	20
3. How do you explain the fact that though an iron ball weighing ten pounds is attracted towards the earth by a force ten times as great as is one weighing one pound the two balls when left free to fall side by side reach the ground together?	12
4. Explain fully the method of observing with the pendulum to determine the force of gravity, stating the sources of error, and the precautions which must be taken to avoid or correct for them.	20
5. How does the force of gravity vary at different places on the earth's surface?	12
6. Explain the use of the magnetometer to determine the horizontal force of the earth's magnetism.	20

## METEOROLOGY, GEOLOGY AND MINERALOGY.

*(Time, 3 hours.)*

Marks.

- |  |    |
|--|----|
| 1. Describe a good form of normal barometer, state the different sources of error in its indications and explain how each is dealt with.                     | 15 |
| 2. How is an anemometer rated?   | 10 |
| 3. Explain the influence of the rotation of the earth on the direction of the wind.  | 10 |
| 4. How is evaporation measured?  | 10 |
| 5. What are the general characteristics of metamorphic rocks? Mention some of the varieties.   | 10 |
| 6. What is the nature of fissure veins and what structure do they assume? Give the meaning of the terms "hanging wall," "foot wall," "Gossans," "stockwork." | 10 |
| 7. Classify mountains according to their structure and origin.   | 10 |

# REPORTS OF SURVEYORS





# GENERAL REPORTS OF SURVEYORS

## 1908-1909

### APPENDIX No. 13.

#### REPORT OF C. F. AYLSWORTH, JR., D.L.S.

##### RESURVEYS IN EASTERN MANITOBA.

MADOC, ONT., February 24, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to inform you that according to your instructions dated April 4, 1908, I left Madoc on April 6 for Winnipeg after having communicated with my assistants and interviewed some prospective members of my party.

I arrived in Winnipeg on the 12th and proceeded to organize a party and purchase supplies. After completing those preliminaries we proceeded to Beausejour.

Beausejour is still growing, Mr. Keilbach the manager of the Beausejour glass works still has confidence that he can produce a good quality of glass there. His original equipment for manufacturing glass was not a success. He discarded it and installed a new and revised process and has engaged American employees who have had experience under conditions similar to those existing at Beausejour. He is confident that he is now proceeding along lines that will ultimately prove successful. As the alterations were not completed when I left I cannot give an opinion as to his prospects under the new process.

The assistants joined the party here, and helped to put the transport and camp equipment in order. After being delayed four days on account of rain and snow we left Beausejour on April 28 for township 16, range 7, east of the principal meridian over a road that the heavy storms had rendered almost impassable. On the 21st, a week previous, I passed over this road en route to township 16, range 8, and it was then as hard and smooth as an asphalt pavement. It was almost incomprehensible that a four days' storm could work such a transformation. About two miles out from Beausejour one of the wagons went down in the mud. When we were extricating it our provisions became strewn in the mud and the wagon box partially filled with water. The gumbo stuck to the wheels and accumulated to such an extent that it crowded against the wagon box and stopped the horses about every ten chains. We removed the gumbo with shovels and proceeded again.

As it was the first work for the horses after leaving their winter quarters they had not much strength to meet such heavy demands. They were not accustomed to their collars, and it was no surprise that they were balky. Surveyors' work is a training school to produce balky horses. We proceeded wearily along, the surveyor and the members of his party being not in much better condition than the horses. With new clothing and new boots, not worn sufficiently to become fitted, we also became weighted down and had to stop every now and then to remove the mud from our feet.

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Then another team became "hung up" in the mud and we had to "double up" by hitching another team ahead in the hope that the latter team could find solid footing. Then every body shoved and pulled only to find that all four horses had become mired in the mud. In the end we were compelled to portage the load across the muskeg on our backs; we then extricated the wagon, loaded it up again and prepared to proceed when we found that the other wagons had to be handled in the same way. By noon we were all covered with mud and wet through, the surveyor himself presenting the least attractive appearance as he was leader, guide and instructor in all the movements; otherwise delays and losses would have been caused by discussion among the members of the party as to who should perform the work. If the surveyor in such cases is fortunate enough to have a time-tried, reliable teamster, he is relieved of much of this labour, but as the teamster who had been with me for over eight years found a more suitable position during the past winter, I can assure you I missed him when the whole responsibility fell upon me. After proceeding in this laborious fashion until evening we found a dry clean spot for camp on the north boundary of township 14 on the west bank of Brokenhead river. Both men and horses were exhausted when we arrived there and felt more like prostrating ourselves upon the grass than putting up our tents. But we did put them up, and decided to lay up for physical repairs for men and horses the following day. Then on Thursday the 30th we proceeded, and to the delight of all, we found that the recent storm area had not extended any farther north and that the roads now, except in the sheltered bush where they were not exposed to the drying influence of the sun, were dry and passable. Especially was this so in township 16, range 7, where we passed over a sand ridge trail, to the west side of Gull lake on sections 35 and 36 where we camped. We found this whole district had been recently overrun by a prairie fire, causing the pasture to deteriorate, which at best is indifferent on the jackpine sand ridges. We were compelled to supplement the pasture by providing other feed for the horses. The poor condition of the roads to Beausejour rendered it comparatively expensive to freight supplies from there.

We completed the resurvey of township 16, range 7, east of the principal meridian; the work was very laborious, as on account of the muskeg nature of the area to be surveyed, we were unable to locate a camp at a central point, and were thus subjected to very long walks over tamarack muskegs. I did not resurvey sections 29, 30, 31 and 32 as the necessary preliminary steps had not been complied with on account of the incorrect information the year previous to the effect that no one lived on those sections; whereas sections 31 and 32 at least are occupied.

As I have already written you, if these sections are resurveyed in the future, care should be exercised in the survey, as the original blazed lines for the north half of the east boundary of sections 35, 34 and 32 intersects the north boundary of these sections from one to three chains east of the posts where they should intersect.

Already the settlers have chopped out a road for the east boundary of section 31 and no doubt it will be found to be located in the wrong place, as it is probable the original blazed line was followed, instead of adhering to the posts. The post for the northeast corner of section 31 stands between two and three chains west of the original surveyed line for the east boundary of the section.

As usual we experienced no difficulty in finding the original posts and lines in this township; which we completed May 23.

On account of unfair weather and the moving of camp we were delayed in commencing work in township 17, range 8, east of the principal meridian, until May 30. About half the area we subdivided in this township consists of hilly jackpine sand ridges and the greater portion of the east half of the south half of the township consists of open muskegs and tamarack, spruce and cedar swamps. I have been told that the cedar was taken from here to construct the buildings of the Hudson's Bay company at Fort Alexander many years ago, and there is considerable of it in this swamp yet. But now that the lines have been resurveyed and the public have become acquainted with this fact, it will scarcely survive this winter.

## SESSIONAL PAPER No. 25b

Another (which I will term a forestry) phenomenon was observed by us in 1907 when we found mountain ash growing in the bush remote from settlement present or past, on the east boundary of section 14, township 16, range 7, east of the principal meridian. On June 22 we completed the resurvey of the south half of township 17, range 8, and on the 23rd left for township 16, range 1, which I was instructed on May 4 by you to resurvey. Passing through township 16, and part of 15, on the road between ranges 7 and 8, we found the road on account of recent heavy downpours of rain to be in an almost impassable condition. From there on we found the roads ideal compared with what they were in the spring.

During the progress of this trip we were afforded an excellent opportunity of observing the promising condition of the crops which were of rank growth and presenting that rich green luxuriant appearance so gratifying to the beholder. Never before in the history of Manitoba were the necessary conditions all complied with so faithfully for a successful crop. When the wheat began to head out the farmers began to complain of drouth, and the burning up, on account of the intense heat and hot winds. But with all the calamities of dry weather the farmer who had tilled his land industriously and intelligently reaped a good reward; the farmer who conducted his farming operations indifferently suffered the consequences of a poor crop. The latter condition was painfully apparent in that old settled district lying between Stonewall and Balmoral. One could detect instantly the laggards in the agricultural ranks when the seed was being planted and when the resulting crops were being gathered. So in this particular instance it was only the indifferent farmers who suffered by this drouth calamity.

We arrived at, and camped on, section 2, township 16, range 1, on July 2. We completed the resurvey of this township. The soil is of an inferior quality, although the hardy settlers who are already on the land are well satisfied, and will doubtless give a good account of themselves as farmers in the future. Generally speaking they all have good positions and work in the city most of the time, but their families are on their homesteads here. They complain bitterly about the lack of interest the provincial and municipal authorities take in providing them with roads and schools. But from my observation of them they will not abide by this adverse condition of their affairs long as they are quite capable of looking after themselves. The provincial authorities recognized their necessities by sending in an engineer to take the levels for proposed roads, and it is to be hoped that this will soon be followed by actual constructed roads and ditches, to provide them with means of ingress and egress at all seasons of the year, and to relieve the farms of surplus water. At present diving suits would be the proper equipment while travelling through many parts of the township during rainy seasons and periods. This township may be reached by one of the finest graded roads in Manitoba, some parts of which are gravelled. It is the favourite rendezvous of Winnipeg motorists.

After the completion of the resurvey of this township on August 27 we moved to section 20, township 11, range 7, which we had instructions to resurvey. Whatever is the reason, there are very few settlers in this township. Perhaps now that the landmarks may be found, some interest may be taken in it as there is much poorer land than this occupied throughout the Northwest. The Winnipeg and Lac du Bonnet power line runs almost diagonally across this township. It is nearly denuded of useful timber.

On October 15 we completed the resurvey of this township and then proceeded via Beausejour to the northwest quarter of section 14, township 12, range 5, where we surveyed the north boundary of section 15. We were compelled to survey five and a half miles of section lines in order to locate the corner of this one line a mile in length. We established properly all the corners that we visited or passed.

I have no hesitation in recommending the completion of the resurvey of the balance of this township. We completed this survey on October 23, and on the 24th left

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for township 18, range 3, west of the principal meridian. On the 31st we arrived at and camped on, section 15. We found the roads simply superb leading to this township and made the resurvey without any difficulty. We unexpectedly found the original survey very well performed indeed. There are only a few settlers in the township; there is very little wood and the soil is not of first quality.

All the settlers, mostly Icelanders, are occupied considerable of their time fishing either in lake Manitoba or lake Winnipeg.

I used the angle iron posts in this township as they were mislaid by the railways and only reached me in time for this survey.

We completed the resurvey on December 10, broke up camp on the 11th, discharged all the party except the two assistants and returned to Winnipeg.

On Monday the 14th, accompanied by the two assistants, I left by train for Gimli en route to Hnausa to survey the Baldur school site on the southeast quarter of section 21, township 22, range 4, east of the principal meridian, according to your instructions. We completed this on Saturday, December 19, and immediately left for Winnipeg. After completing the balance of the business there, I left for home where I arrived on December 26.

The season was very satisfactory for survey operations with us, and as I am sure my returns will reveal, we took every advantage of it.

In conclusion, I may be permitted to point out that the innovation of appointing two assistants on my survey party during the past season proved entirely satisfactory to me, and I trust that in the future the same policy will be continued, because it enables a surveyor to perform more and better work, especially in the case of resurveys where such a wealth of detail is involved.

I have the honour to be, sir,

Your obedient servant,

C. F. AYLSWORTH, JR., D.L.S.

## APPENDIX No. 14.

## REPORT OF DAVID BEATTY, D.L.S.

## SURVEY OF PART OF THE BOUNDARY OF PORCUPINE FOREST RESERVE.

PARRY SOUND, February 25, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to report that under your instructions of May 21, 1908, to make a survey of the outlines of Porcupine forest reserve, I left home on June 8 for Winnipeg, where I remained two days purchasing supplies. I then proceeded to Battleford for my outfit which I had stored with the Hudson's Bay company and from there went to Prince Albert expecting to secure men who were accustomed to using pack horses. I was, however, unable to get any and proceeded to Swan River settlement where I met Mr. Evans, my assistant, hired my survey party, bought teams and wagons and went into camp waiting for my outfit from Battleford which did not arrive till the morning of June 27. On the 28th I started with my party for the northeast corner of township 38, range 30. From Swan River I had about four miles of graded road, then an old wagon trail to the crossing of the Manitoba boundary in township 38 between ranges 29 and 30, and from there I cut a new trail about five miles to the northeast angle of township 38, range 30. About ten miles of the road from Swan River was fairly good wheeling and then the country became low, flat and wet; the bridges across the streams were all gone and had to be rebuilt as well as having to brush many low places. From the northeast corner of township 38, range 30, I established the southeast corner of township 39, range 30, as directed in your instructions, having first observed Polaris at eastern elongation for magnetic variation which I found to be  $18^{\circ}$  east. From the southeast angle of township 39 I ran the south boundary  $270^{\circ}$  across range 30, establishing and building the several section and quarter section corners and continued the line across range 31 without blazing as a trial line. I then went through to the southwest angle of township 39, range 32, on the second meridian, ran the south boundary of this township  $90^{\circ} 06'$  and found that my line was 13.79 chains south of the trial line that I had run across range 31. I ran the south boundary of township 39, range 31,  $88^{\circ} 26'$ , allowing  $18^{\circ}$  magnetic variation, connecting with the southeast angle which I had already established. Going west from my starting point I was able to make a wagon road only to within about eight miles of the second meridian on account of muskegs extending too far both north and south of my line and was obliged to move my camp and supplies by packing for the balance of the survey through to the second meridian. About one-half of ranges 30 and 31 appeared to be muskeg and swamp with small spruce and tamarack. I returned to my starting point on August 19 and commenced to survey north and east; the north boundary of section 7, township 39, range 29, crosses Whitefish lake leaving eight or ten chains of the lake in the reserve. While camped at the lake a few very good whitefish and pickerel were caught; the lake has an area of about three square miles. Working east and north around the reserve to the northeast angle of township 41, range 27, I found the country similar to that in ranges 30 and 31, viz., about one-half muskeg and swamp

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with much dead timber on the ground causing a lot of work to make a wagon road; about three-quarters of my time was spent in making a road. I cut a road from the southeast corner of township 40, range 28, about eight miles south to connect with a lumberman's road which saved many miles of bad road in getting in my supplies from Swan River. The whole country has been burnt over about twenty years ago and dead timber is piled high in many places. Snow fell on November 9, 10 and 11, to a depth of about twenty inches. After working a few days longer, I found it very unprofitable making roads through the fallen timber in the deep snow and decided to discontinue the survey. The road is cut to section 24, township 41. Bell river crosses the boundary flowing eastward in section 36, township 41, through a gully about one hundred and fifty feet deep. I saw no merchantable timber along the lines of survey. There are no minerals or quarries, and the only game I saw was moose.

I have the honour to be, sir,

Your obedient servant,

DAVID BEATTY, D.L.S.

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## APPENDIX No. 15.

## REPORT OF P. R. A. BELANGER, D.L.S.

INSPECTION OF CONTRACTS IN EASTERN MANITOBA.

OTTAWA, February 27, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of my operations during the past season, in connection with the inspection of survey contracts and the verification of the traverse of Winnipeg river and Pinawa channel.

On receipt of your instructions dated March 28, 1908, I made my preparations for departure, and left Ottawa on April 5 for Edmonton where I had to procure my outfit which was stored in that vicinity after the close of last year's operations.

Arriving at Edmonton I experienced unavoidable delay in securing a car for the shipment of the outfit to Lac du Bonnet, and could not leave Edmonton until the 21st.

I reached Winnipeg on the 23rd, proceeded to hire my party, and spent the following three days in organizing the same and buying supplies. On the 28th I boarded the train for Lac du Bonnet.

On my arrival at this place on the evening of the same day, I found I would be delayed, as the ferry boat was out of order, and finding it impossible to use my horses for transport, I had to secure boats for this purpose. After procuring the only one available, at Lac du Bonnet I left for the site of the Winnipeg Electric Railway Company's power plant situated on Pinawa channel where I secured the remainder of the boats necessary for the work and proceeded at once on my journey up Pinawa channel and Winnipeg river to Slave falls where after a couple of days of arduous work rowing up the rapid stream I pitched camp near my initial point, the south boundary of township 15, range 14, east of the principal meridian where it intersects the right bank of Winnipeg river, and from May 7th to 15th I was engaged in traversing both banks of that portion of the river between the south and east boundaries of township 15, range 14.

Having fulfilled the first part of my instructions I returned by boat to Lac du Bonnet where I spent the two following days waiting for a car to transport my outfit to Gimli. I reached that place on the 19th.

A heavy rain having set in I left the party there and proceeded to Winnipeg to inspect the iron posts, according to your instructions.

Returning to Gimli, I found it impossible to move camp on account of the continuous heavy rains and very muddy roads, the former being so heavy that the country was flooded and bridges carried away.

During this wet interval my assistants and myself were kept busy copying notes, making plots of Winnipeg river, organizing a pack train and making arrangements to leave my wagons behind, as it was impossible to proceed with them.

On the 26th the rain having ceased I left Gimli for Tyrrell's contract of 1907, and after travelling for three days in water and mud up to the knees, I arrived there on the evening of the 29th and pitched camp in township 24, range 2. I was engaged on the examination of this contract from May 30 to June 11 and then returned to Gimli.



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Arriving there, I sent a flying party composed of one assistant and three men to examine the mounding in Tyrrell's contract of 1906 at Lac du Bonnet; with the remainder of the party I proceeded to St. Boniface arriving there on the 18th, where I was compelled to wait until the 22nd for the arrival of the flying party I had sent to Lac du Bonnet, they having been delayed by the very heavy rains which prevailed during the whole time of their absence causing them great hardship and suffering, while carrying on this work.

The following day, I left via the Dawson road with the party to examine Molloy's contract of 1907, covering eight townships in range 15; we camped in township 6 of that range on the 29th. The inspection of the northern part of this contract occupied seven days, after which I returned to Ste. Anne, where I left my transport outfit and boarded the train for Gravel Pit Spur siding, and spent five days more examining the southern portion of the contract.

On July 19, I reached Ste. Anne, leaving there the next day for Lac du Bonnet, according to instructions, to verify the position of a witness mark on the east boundary of section 12, township 15, range 13, which work necessitated long arduous travelling on foot over a very marshy, mossy and rocky country in extremely hot weather. Being obliged to sleep in the open I was pestered with flies.

After this work I proceeded to Oak Point settlement which place I reached on August 1, and finding I would be unable to take my supplies by land on account of the bad state of the roads, I hired a sail boat to take the bulk of them and some of the party to Mooschoorn bay, and sent on my wagons light in charge of three men to meet me there. I was delayed in sailing, by calm weather and contrary winds and could not reach the bay until the 9th.

Here, I was employed thirteen days in inspecting Teasdale's contract of 1907 which extended along lake Manitoba, north, south and east of Moosehorn bay.

From this contract, I crossed the lake to Crane bay to examine Fawcett's contract of 1907, which kept me busy until September 12, after which I returned to Moosehorn bay P.O. via 'The Narrows' and secured my mail, but was delayed till the 19th waiting the arrival of my supplies. I then proceeded with the examination of the western part of Teasdale's contract of 1908 which was ready for inspection, and I was occupied at this for nine days, reaching Oak Point on October 4, where I awaited a reply to my telegram respecting final instructions, after receipt of which I proceeded once more to Lac du Bonnet, via Stonewall, from which place I took the train with my party, and sent my transport outfit to St. Laurent for safe keeping until I should again need it; I arrived at my destination on the 10th.

After a good deal of trouble in securing boats, rowing up Pinawa channel and the river, and portaging over many falls I reached the initial point for the continuation of the traverse of Winnipeg river on the 16th.

During the next two months I was employed in traversing both banks of Winnipeg river across part of township 14, range 13, and across the whole of townships 13 and 14, range 12, and townships 15 and 16, ranges 14 and 15 together with both banks of Pinawa channel across township 14, range 12, all east of the principal meridian. After the completion of this work I proceeded to inspect Tyrrell's contract of 1908 reaching Fisher river in township 25, range 1, west of the principal meridian on December 25.

This occupied fifteen days and my intention then was to complete the inspection of Teasdale's contract of 1908, but finding that my provisions were running short and being unable to secure a further supply in the locality at any cost, and on account of the impossibility of securing feed for my horses, I had, to my great regret to leave that part of the contract unexamined. I therefore returned to Oak Point where I dismissed part of my party and then proceeded to St. Laurent to deliver over my outfit for the winter, after which I left for home via Winnipeg where I discharged the balance of my party and settled up outstanding accounts, reaching Ottawa on February 2.



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The detail of my inspection is given in the reports on the separate contracts. The contractors' work in general, with one exception, proved satisfactory. It is hardly necessary for me to give any extended report of the country inspected, as I consider that the surveyors who have seen every mile of the townships covered by their contracts are in a better position to furnish such a report; however I might remark that from my observations, the country is not at the present time ready for immediate settlement, being mostly covered with bush or heavy scrub, but some homesteads are to be found in scattered localities, principally in Teasdale's and Tyrrell's contracts, and no doubt when the country becomes opened, either by fire or otherwise, so that evaporation may take place, it will be very suitable for settlement in many places, provided proper roads are built to assist its development.

Some hardy colonists have already reached this latter section, perhaps attracted by the great quantity of game of all kinds which abounds, the tracks of which are to be seen in every direction. Herds of elk and numbers of moose and smaller animals appear to have selected that country as their breeding ground.

Waterfowl and fish, though not so abundant as in the early days are still to be found in large numbers in all the lakes and streams.

There are three main routes of access to this part of the country, the Colonization road to Fisher river, the road from Oak Point settlement to Fairford via 'The Narrows' and Moosehorn bay, and the road from Gimli via Hnausa to Fisher River Indian reserve, but the first would require to be extended from Fisher river a few miles northerly where it would connect with the transversal roads opened by the surveyors, and considerable improvements should be made on that part already opened, in the shape of bridges and grading.

The second and third, in their present state, are practically winter roads, which can be used only in summer time by light vehicles, there being no bridges and the road in places passing through the lake and over swamps which need to be graded. The best means of access to the west part of the country just described is by boat via lake Manitoba which is the route most generally used in the wet season by the settlers already located there.

No indications of minerals were detected in the country I traversed.

The principal resource of the country covered by Molloy's contract as far as I could judge is the timber which can be converted into pulp or lumber, the best part of which, I am told, is in the Sprague timber limit in township 1, range 15, where large spruce, cedar, tamarack and poplar of first quality is found in great quantities. Access to this part of the country is obtainable via the Dawson route and Canadian Northern railway, on which a station called 'Gravel Pit Spur Siding' is situated in that township.

As to Fawcett's contract, having reached it by water route via lake Manitoba and Crane bay, I am not in a position to state the best means of access by land.

Along Winnipeg river, a great deal of activity is noticed in the construction of dams, the blasting of channels, &c., in connection with the Winnipeg Electric railway and the City of Winnipeg Power company's works. The latter, for the purpose of installing their plant during the coming summer, at Pointe du Bois falls, during the course of last year, constructed a railway from Lac du Bonnet to that point, and the former, having built their plant on Pinawa channel and constructed a transmission line to the city of Winnipeg, are continually improving their power by means of dams in Winnipeg river and the blasting of channels to increase the water pressure. This blasting has greatly increased the volume of water passing through Pinawa channel, and caused some change in its shore lines by the widening of the bed of the stream and the flooding of its banks for many chains in width in low places.

The country on both sides of the river was formerly well covered with large timber, a great portion of this has already been cut, but there still remains a great quantity suitable for building or pulp purposes.

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As already reported by different surveyors and explorers there are on this river numerous important falls where good water-powers could be developed other than those already utilized. There is also abundance of fish principally of the sturgeon variety.

Climatic conditions may be said to be practically the same as in the neighbourhood of Winnipeg.

During the course of my operations I experienced unavoidable delays caused by the inclemency of the weather during the first part of the season, the numerous moves from one contract to another, the multiplicity of change in transport and the uncertainty of the winds in connection with my moves by water routes, notwithstanding which, I consider that I accomplished as much work as could be expected under such circumstances.

Before closing this report I might say that my assistants rendered me good service, being at all times ready to fulfil their duties with a desire to please, and proved to be well qualified for their positions.

I have the honour to be, sir,  
Your obedient servant,

P. R. A. BELANGER, D.L.S.

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## APPENDIX No. 16.

## REPORT OF E. R. BINGHAM, D.L.S.

## SURVEYS AT THE PAS.

FORT WILLIAM, ONT., Sept. 9, 1908.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to report that in accordance with your instructions of August 10, last, I left Fort William on the 16th for the Pas to make a survey of that settlement in company with Mr. H. Finger.

During the few minutes the train stopped at Dauphin we interviewed the officials of the Canadian Northern railway with regard to obtaining transport from Hudson Bay Junction to the Pas over their partially constructed line. These officials stated that we could obtain hand cars at Hudson Bay Junction, or, better still, that Mr. Dart, lumberman, of Erwood, had a gasoline rail motor car, and that he would no doubt be able to take us to the Pas.

We arrived at Hudson Bay Junction very early on the morning of August 18. As soon as we were able to get the agent up we enquired as to the handcars, but learned that none were there. Two were at the Pas, but as the company's telephone line to that place was down, they were inaccessible. We then telegraphed to Mr. Dart and arranged for him to take us to the Pas, provided we could obtain permission for him to run from Erwood to the Junction. We telegraphed to the Canadian Northern railway officials at Dauphin, but in spite of our previous conversation with them, we were unable to obtain this permission. Mr. Dart brought his motor by express to Hudson Bay Junction on the morning of the 20th and we left immediately for the Pas, arriving there the same evening. During the evening I enquired for men to assist in the survey of the settlement, and was able to commence work in good time on the following morning, continuing the work on the 22nd, 24th and the early part of the 25th.

I laid out six lots between the easterly limit of Block 'A' and the westerly limit of Block 'B' of the Pas Indian reserve. The easterly limit of the settlement extends back southerly eighty chains from the south bank of the Saskatchewan river along the easterly limit of Block 'B' and its production, the rear line running westerly therefrom, parallel to the line previously run by Lewis Bolton, D.L.S., and approximately parallel to the south bank of the river, to the easterly limit of Block 'A.'

On the afternoon of the 25th, I left, with others, returning to Hudson Bay Junction on a hand car with a broken cogwheel, which a crew of four Indians, afterwards increased to six, were unable to propel without repeated assistance from the other members of the party. However, we reached Hudson Bay Junction on the 26th in time to catch the evening southbound train. I arrived in Fort William on the morning of August 29.

Although rails have been laid from Hudson Bay Junction to the Pas, the track is ballasted for only about a third of the way, partially about another third, and un-

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ballasted for the remaining distance. Many bad sun kinks hidden by tall weeds added considerably to the excitement of travel, particularly at night.

Previous reports have dealt fully with conditions at the Pas. A few settlers have gone into the townsite of the Pas and a boarding and bunk house has been opened up. The settlers are fully alive to the future importance of the place when the Canadian Northern railway will have been completed into the town, the construction of the railway to Fort Churchill commenced, and active operations begun by the lumbering interests which will inevitably centre there when shipping facilities are thus secured.

I have the honour to be, sir,

Your obedient servant.

E. R. BINGHAM, D.L.S.

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## APPENDIX No. 17.

## REPORT OF C. E. BOURGAULT, D. L. S.

RESURVEYS IN EASTERN SASKATCHEWAN.

ST. JEAN PORT JOLI, QUE., March 15, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General.  
Ottawa.

SIR,—I have the honour to submit the following report on the miscellaneous surveys made by me during the past season in the province of Saskatchewan.

In accordance with your instructions of March 30, 1908, I left home on April 21 for Winnipeg where I arrived on the 27th, having been delayed one day at Montreal repairing my instrument and also one day at Ottawa getting complete instructions.

At Winnipeg I hired two men whom I took to Teulon, where I had left my outfit the previous season with Mr. W. C. McKinnell. I loaded my outfit on a car and shipped it to Yorkton where I was instructed to organize my party. While waiting at Yorkton for my outfit, which did not arrive until May 4, I hired men and bought supplies.

It took two days to repair my wagons and harness, as the tradesmen were very busy at that time, but on May 7 I moved my camp to township 20, range 2, west of the second meridian, to investigate the necessity of a retracement and restoration survey in that township.

I found an error of about one chain in the length of the north boundary of section 31, township 19, range 2 and also an error in the marking of the same line. The true chainage is 80.98 chains. I did not put any iron posts at quarter sections as all the posts ordered from Winnipeg had not arrived.

After completing the retracement of those sections needed in townships 19 and 20 I moved my camp on May 20 to township 20, range 4 and retraced the whole township. The surface is open country and the township is settled with vigorous and intelligent farmers who seem proud of the country but afraid of the summer frosts. On May 20 heavy frost occurred forming two inches of ice, and on the following day six inches of snow fell, which, however, soon melted.

The soil is suitable for all kinds of grain and vegetables, but water is very scarce, and the nearest wood fuel is twenty miles north.

On June 5 I moved my camp to township 21, range 8, where I retraced the lines of several sections in order to make them close within the limit of error allowed by the Manual.

In accordance with my instructions I made some retracement and restoration survey in township 23, range 8 and in townships 21 and 22, range 5. In this last township I ran the north boundary of section 10 and found the quarter section post to be 1.15 chains north of the true corner, but the owner of the north part of the section refused to accept any corrections.

On July 1, I went to Qu'Appelle, passing through a fairly well settled country, where good crops were seen on every side. Qu'Appelle is an old Hudson's Bay Company's trading post situated on a flat on the river of the same name between the two Fishing lakes. Little progress has been made and the streets seem deserted. I carried out the resurvey of the outline of the company's reserve according to instructions. None of the company's officials could furnish any information regarding the original survey which was made about twenty years ago. This work was completed on July 15. While working here the flies were very bad and the weather hot. I then proceeded to

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township 17, range 13 to investigate the necessity of traversing Deep lake. I saw that some corrections were necessary, especially on the southeast part, so according to instructions I made a new traverse of the lake. The shores have not changed as the height of the banks is from six to twelve feet, but the water seems to be higher than formerly. This may be due to the heavy rains during the month of June.

On July 22 I moved to township 16, range 15 to determine the bearings of certain lines in order to have the blocks close within the limit of error allowed by the Manual of Survey. I resurveyed all sections mentioned in my instructions and later received instructions to resurvey the whole township, which I was unable to do as I had left the township before the instructions reached me, and was too far away to return.

I next resurveyed the north boundaries of sections 32, 33 and 34 and the east boundary of section 33 in township 14, range 9, and made corrections satisfactory to the owners of the adjoining quarter sections.

From there I moved to investigate an error at the northeast corner of section 8 in township 11, range 2. Two sets of monuments existed there and were the cause of trouble between the owners of adjoining lands. I succeeded in getting the owners of the quarter sections concerned to agree to a resurvey which destroyed one set of monuments.

On August 12 heavy frost occurred, forming ice half an inch thick and freezing all the vegetables. The early grain crops were only slightly damaged, but the late crops suffered severely.

While in township 9, range 3, preparing to do my work there I received your instructions to proceed with the survey of the Doukhobor village in township 31, range 3, and I set out at once over roads which were very bad after several days' rain, and arrived there on August 27. The first day was employed discussing the plan of subdivision with Mr. Michael White the Doukhobor interpreter. I arranged a meeting with the Doukhobors to show them the plan of the roads and all were satisfied with the arrangement except the owner of the quarter section; his land was cut into parcels by the new road. I followed the suggestions of the interpreter who explained that the road was located for the convenience of the whole village, and when the subdivision was finished and the road surveyed this formerly dissatisfied Doukhobor was as well pleased as the others.

All the houses of the village lie in rows a few feet apart, and appear to be very neat and clean. These Doukhobors are a good class of immigrants, moral, quiet and industrious. They have cultivated their lands well and appear to be proud of their crops.

On September 1, I made some correction surveys in township 30, range 3, and next day commenced a long move to township 29, range 17.

This township is well suited for mixed farming and stock raising. The water is good, wood is plentiful for fencing and fuel, and the soil is composed of a black loam and good sand. The north part is well watered by Whitewood lake. I did not traverse this lake because I had no canoe and could not obtain one in the vicinity. The shores of the lake are covered with scrub and willow and it would have taken fifteen days to complete the work. I therefore decided to return to township 9, ranges 3 and 4, to complete the work I left in August.

On my way back I made some retracement surveys in township 16, range 28, west of the principal meridian, for two settlers.

The work in township 9, ranges 3 and 4, kept me busy till the beginning of December. The weather had become very cold and I decided to close operations for the season. I accordingly stored my outfit and paid off my men and returned home, arriving at St. Jean Port Joli on December 17.

I have the honour to be, sir,

Your obedient servant,

C. E. BOURGALT, D.L.S.

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## APPENDIX No. 18.

## REPORT OF P. A. CARSON, D.L.S.

## TRIANGULATION SURVEYS IN THE RAILWAY BELT OF BRITISH COLUMBIA.

OTTAWA, March 17, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report of my field operations on the triangulation in British Columbia, in connection with the Trigonometrical Section of the Topographical Survey of Canada, for the season of 1908. This report should be read in conjunction with my annual reports for the years 1906 and 1907.

Information having reached me early in the spring of 1908 that the winter in the Rocky and Selkirk mountains had been exceptionally mild, I decided to leave for the field earlier than usual. Consequently I set out from Ottawa for the west on May 23, a fortnight earlier than on the previous season. On arriving in the mountains, however, I discovered that although the snowfall had been rather less than the average, the spring, especially during the month of May, had been backward, and in the higher elevations of the mountain slopes and in those spots unexposed to the sun the snow had not melted very rapidly.

At Golden, B. C., where I had stored my outfit the previous autumn, I made up my party of five men, and was fortunate in again securing the services of my cook and packer of the previous season. Of the eight pack-horses which wintered in the Columbia valley, twenty-nine miles south of Golden, one had died in the early spring, but the others were all in excellent condition.

I first visited the base line in the Columbia valley, twenty miles south of Golden, and took a series of observations for azimuth with the astronomical transit, by observing on a programme of time and azimuth stars, according to the method described in Hayford's 'Geodetic Astronomy,' except that instead of one azimuth star two were observed in each half set or group. The terrestrial azimuth mark used was a lantern with a small slit, one inch in vertical height, and one-third inch wide, at a distance of one mile. The calculations were made according to Hayford's method of approximation without the use of least squares. Although this method of determining azimuths is one capable of great refinement and accuracy its use in a triangulation of a secondary character is scarcely justified, on account of the cumbersome nature of the astronomical transit, the difficulty in placing a distant terrestrial azimuth signal, the time spent in actual observing, and the lengthy reduction calculations, either with or without the use of least squares. Azimuths of the same degree of accuracy as the rest of the triangulation can easily be obtained by taking a series of observations on Polaris with the ordinary triangulation theodolite, provided the instrument will permit the telescope to rotate to a sufficiently high altitude.

Stations 'A' and 'B,' at the ends of the base line were occupied; also stations 'C,' 'D' and 'E,' for the projection of the base to the main triangulation; and station 'XX,' (Beaverfoot) of the main system. At stations 'C' (elevation 8,007 feet) and 'XX,' (elevation 7,940 feet), on the Beaverfoot range, on June 24 the snow was still several feet deep, even below timber line.



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## STATION XXI (SPILLIMACHEEN).

From June 28 to July 6, I made a trip up the middle fork of Spillimacheen river, via Carbonate Landing, Summit lake, and the middle fork trail, advancing up the valley of the middle fork to Spruce camp (elevation 5,500 feet), about four miles from the head of the stream, and near the south limit of the railway belt. The trail up the valley was in fairly good condition, although it is now seldom used, the numerous mining prospects in this district having never been developed. There is good grass for horses along the upper portion of the trail on the many slides from the mountains.

I established and read angles at station 'XXI.' (Spillimacheen) and the secondary stations 'XXI A.' and 'XXI B.' on the peaks lying between the middle and north forks. Station 'XXI' is situated on the sharp peak of the highest mountain of this range, at an elevation of 9,410 feet. The station is marked in a permanent manner by means of a brass bolt six inches long and three-quarters of an inch in diameter with a flat head one and one-half inches square, and one-half inch thick. This bolt is set in a hole drilled in the solid rock, and firmly fixed by cement. The head of the bolt is stamped with the Roman numerals 'XXI,' followed by a triangle  $\Delta$ ; the apex of the triangle faces north at the centre of the head of the bolt, and is the geodetic point. As reference points, two holes, one inch in diameter were drilled in the rock. The reference points are each six feet distant from the geodetic point, and bear respectively south and west from it. Directly over the brass bolt a conical stone cairn was erected, four feet in diameter at the base and six feet high. The top of the cairn is vertically above the geodetic point. A band of white cotton was wound around the cairn, about a foot from the top, to assist as a signal. The ascent to station 'XXI' was rather difficult as we did not discover the easiest route until we commenced to descend. While on the summit a severe electrical storm took place, somewhat similar to the one on Mt. Kapristo (station 'E') in 1907.

Station 'XXI B' is situated on a lower peak (elevation 8,825 feet) about two miles east of station 'XXI.' The station is marked only by a conical stone cairn eight feet high.

Station 'XXI A,' which was established by Mr. W. S. Drewry in 1891, is situated about a mile east of station 'XXI B,' on the most easterly mountain of the range being between the middle and north forks of Spillimacheen river. The station is marked only by a conical stone cairn, seven feet high, the brass bolt placed here in 1906 having been moved to the present location of primary station 'XXI.'

A reference station was also placed in the middle fork valley, being a spruce post, six inches square, and three feet long, marked 'station XXI C,' and angles were read to and from stations 'XXI' and 'XXI B.' From the positions of these stations the location of this reference post has been calculated, and may be used for commencing new surveys, or tying in mineral claims, &c., the Dominion system of surveys not having been extended to this vicinity.

During our trip up the Spillimacheen it rained on four of the ten days. On returning to Carbonate Landing we met a party of American college tourists, above twenty-five strong, both men and women, who were spending a month in the mountains ostensibly for the purpose of making a scientific study of the geology, mineralogy and botany of the district. Each year sees the Canadian Rockies becoming more and more popular as a great playground and field for students of nature.

## STATION XIX A (BLAEBERRY).

It was deemed desirable to establish a triangulation station up the Blaeberry valley near the north limit of the railway belt. Consequently on July 15 a start was made from Golden up the Blaeberry pack trail. We went about thirty miles up the river, the first half of the journey being along the timbered eastern slopes of the



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valley, past the Blaeberry falls and canyon, and the latter half along the wide gravel bars of the river, with frequent fordings of the main river and its numerous channels.

In the Blaeberry valley there is some of the finest timber I have ever seen, spruce, fir and some cedar, most of which is under license. Game is somewhat plentiful, bear (both black and grizzly) goat, deer, and marten, while small trout may be caught at the mouths of the small streams flowing into the Blaeberry.

We camped near the mouth of Mummery creek, a glacial stream about thirty feet wide, flowing from the west from Mummery glacier three miles back. The point is about three-quarters of a mile south of the north limit of the railway belt. The mountain on which station 'XIX A' is situated is a prominent peak, (elevation 10,000 feet) three miles immediately east of Mt. Mummery. At its base Blaeberry river takes a sharp turn from the east, and when approaching up the valley towards the north limit of the railway belt the mountain seems to suddenly terminate the valley. The ascent to station 'XIX A' was made via Mummery creek and glacier, up the westerly slope of the mountain, the apparently easier approach up the southerly ridge being broken by rock cuts and gulches, as we learned to our sorrow on attempting the descent by that route, being forced to spend a cold hungry night on the rocks. The station was not placed on the highest peak, which is rather too far back to the north, but was established on the peak visible from the valley (elevation 9,620 feet).

Station 'XIX A' is marked with the usual brass bolt set in a hole drilled in the rock, and firmly fixed by cement. The head of the bolt is stamped with the number of the station, viz., 'XIX A', followed by a triangle '△'; the apex of the triangle faces north at the centre of the head of the bolt, and is the geodetic point. As reference points for determining the position of the permanent mark at any time there were placed two iron bolts firmly fixed by cement in holes drilled in the rock, one bolt being six feet distant from the geodetic point and bearing due north from it and the other bolt five feet from the geodetic point and bearing due east from it. A conical stone cairn was erected directly over the brass bolt, being four feet in diameter at the base and six feet six inches high. The top of the cairn is vertically above the geodetic point. A band of white cotton was wound around the cairn about a foot from the top to assist as a signal.

Connection was made between station 'XIX A' and a wooden post marking the northwest corner of timber berth No. 415, on the east or left bank of Blaeberry river; which post is supposed to be on the north limit of the railway belt. A base line one mile in length was established along the gravel bars of the river, and was connected to the said post of the timber berth by means of a traverse. The base line was projected to the station 'XIX A' by means of two secondary stations.

We then returned along the Blaeberry trail and made an ascent to station 'XIX' on Mt. Laussedat (elevation 10,000 feet) and read angles there on stations 'XIX A' 'XVIII,' 'XVII' 'E,' 'XXII,' 'XXIII,' 'XXVIII' and 'XXX A.' The ascent of Mt. Laussedat makes a very interesting climb, but after our experience of the previous year, no great difficulty was encountered. While observing on the summit I suffered intensely from the cold.

From Mt. Laussedat we returned to Golden on July 29th, the whole trip up the Blaeberry occupying fifteen days, on seven of which it rained. The remaining days were clear and sunny, with excessive heat in the middle of the day.

## STATION XIV (STORM MT.)

From Golden I shipped the horses and outfit to Castle Mountain railway station, in order to occupy station 'XIV,' situated on Storm Mt. (elevation 10,300 feet) on the summit of the main range of the Rockies. On account of the tunnelling and other work being carried on by the Canadian Pacific Railway company in the Kicking Horse pass, the old tote road from Field to Laggan is now impassable for horses, and it is necessary to ship by rail between these points. A full account of the trip to station

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'XIV' was given in my report for 1906, and it will be unnecessary to repeat a description here. The ascent on this occasion was much easier than in 1906, and conditions more favourable for observing on account of the absence of snow on the peak in August.

Fierce forest fires raged in the early part of August in the vicinity of Banff, about the time the disastrous Fernie fires occurred. Fortunately for the triangulation work the prevailing west wind kept the smoke from advancing westward, although the mountains to the east were completely obscured by a thick pall.

#### STATION XVIII (MT. MCARTHUR).

Station 'XVIII,' on the summit of Mt. McArthur (elevation 9,832 feet) was next visited, via Emerald lake wagon road, Yoho pass, and the upper Yoho pack trail. From the high elevation of our camp on Little Yoho river (over 6,500 feet) an easy ascent was made to station 'XVIII,' and angles were read under favourable conditions. The return to Field was made in one day. The weather was all that could be desired during our trip up the Yoho, which lasted five days.

#### STATION XVII (MT. KING).

This station is on the summit of Mt. King (elevation 9,456 feet) in the Van Horne range. A detailed account of how to reach Mt. King from Field is given in my annual report of 1906. During the occupation of this station the weather was favourable for observing, and angles were read on stations 'XIV,' 'XX,' 'C,' 'E,' 'XXI,' 'XXI A,' 'XXI B,' 'XXII,' 'XIX,' 'XIX A,' and 'XVIII.'

On returning to Field the horses and outfit were shipped to Sixmile Creek railway siding.

#### STATION XXX (CHERUB MT.)

From the Sixmile Creek railway siding (elevation 2,600 feet) we ascended the gradual slope of a long ridge covered with *brulé* and fallen timber, which extends from a northwesterly direction towards Sixmile Creek siding. We attained an elevation of 6,000 feet after a three hours steady pull for a distance of three miles; thence advance was made through the sparse timber, past a couple of small alpine lakes forming the headwaters of streams flowing into Columbia river. Continuing in a northwesterly direction we went through a pass at timber line, then along 'The Esplanade' to Sixmile Creek pass, dropping down to Sunbeam lake (elevation 6,700 feet) at the head of Spinster creek, which flows northerly into Gold creek.

During the spring and early summer a party of men engaged by a syndicate from Ohio were employed in cutting trail from Sixmile Creek siding up the north branch of Sixmile creek to some mica claims situated several miles from the mouth of Comedy creek, a confluent of the said north branch from the west. Rich deposits of excellent white mica exist all through the Selkirks from Sixmile to the Big Bend, and there now seems to be some prospect of these claims being developed. The above mentioned trail was impracticable for horses, however, although in future this route will be the better one to reach Cherub Mt., on which station 'XXX' is situated.

As far as location is concerned Mt. Sir Sandford (elevation 11,600 feet), the highest peak in the Selkirks, is a most admirable situation for a triangulation station, and I had proposed to place station 'XXX' on its summit. This mountain is at present the mecca of all alpine pilgrims in Canada, but at the close of the year 1908 all worship at its shrine had been done from afar. During 1903 two parties of aspiring alpinists attacked this majestic mountain, only to be repulsed before reaching the main peak. Sir Sandford's magnificent hoary summit rises over a thousand feet above all neighbouring mountains, and is the most conspicuous feature in this large district of prominent and majestic mountains. From the viewpoint of an alpine

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climber the victorious ascent of Mt. Sir Sandford will be an honourable feat, but for a triangulation or topographical surveyor a snowless and more easily accessible mountain is the goal to be sought.

Station 'XXX' was finally established on Cherub Mt. (elevation 9,740 feet) lying between the north branch of Sixmile creek and Bachelor creek, being about three miles westerly from our camp at Sunbeam lake. The ascent of Cherub Mt. is by no means a difficult one, except for the wide névés and glaciers which must be crossed.

Station 'XXX' was marked in a permanent manner by the usual brass bolt set in a hole drilled in the rock and fixed by cement. The flat top of the bolt was stamped with the Roman numerals 'XXX' followed by a triangle, '△.' The apex of the triangle faces north at the centre of the head of the bolt and is the geodetic point. As reference marks there were set two iron bolts cemented in holes drilled in the rock. One bolt is due north of the geodetic point and distant five feet from it; the other is due east and distant six feet from the geodetic point. A conical stone cairn was built directly over the brass bolt, with its pointed top vertically above the geodetic point. The cairn is five feet in diameter at the base, and eight feet high. A band of white cotton was wound around the cairn to assist as a signal.

Besides station 'XXX' in this vicinity I also established five secondary stations on mountain peaks. These are station 'XXX A' (Cupola Mt.) elevation 8,625 feet; station 'XXX B' (Sentry Mt.) elevation 8,320 feet; station 'XXX C' (Sonata Mt.) elevation 9,830 feet; station 'XXX D' elevation 8,467 feet and station 'XXX E' elevation 8,453 feet. On account of the rough nature of the country in the vicinity of Sixmile creek and Gold creek, the valleys being very narrow and the elevations of the streams and passes extremely high, it is not at all probable that the Dominion system of surveys by means of section lines will ever be extended into this district. Consequently these triangulation stations should prove very useful for locating and tying surveys of mineral claims or timber berths.

From August 1 to 17 we had enjoyed almost perfect weather, with no steady rains, as in August, 1907. From the 18th to the 22nd the air became hazy with the dense smoke from the bush fires, rendering the mountain peaks almost invisible. On August 23 rain commenced to fall, and for eight days it rained and snowed without ceasing. From my experience in the Selkirks it would seem that each year there is a prolonged rain storm, with snow on the mountains about the third week in August.

## STATION XXIX A (BUSH RIVER FORKS).

On returning to Sixmile Creek siding the horses and outfit were shipped to Donald, and we travelled to Bush river by the trail which leads from Donald to the Big Bend and Tete Jaune Cache. This trail had been repaired and cut out by the provincial authorities in the early summer and was in excellent condition. We crossed Bush river at the old crossing in a boat, the horses swimming the stream. The water in the river was considerably lower than at the same date of the previous year. We then moved by pack train along the north or right bank of Bush river, first following the shore of Upper Cygnus lake for a distance of two miles, then making our way along the bank of the river. On the whole there was very little cutting to do as we were able in many places to travel along the gravelly beach; and only when we came to sharp turns in the river were we obliged to do any heavy cutting. The most serious obstruction encountered was a rocky bluff some forty feet high abutting a rapid and deep part of the river. Over the top of this bluff we were forced to cut a trail, and we resumed progress after two hours' delay. By night we had advanced ten miles up the river, although prospectors and trappers had informed me that I could not get a pack train through. On the second day the going was even better, along the wide gravel bars of the river, which runs in several channels, in a general southwesterly direction. By repeated fordings we easily made the nine miles to the forks of Bush

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river (elevation only 2,500 feet). Here the gravel bars ceased, the river below the forks running swiftly in one narrow channel, with a six-foot fall in one place. Except for a short portage around this fall, Bush river is navigable for canoes and small boats, the current running at about three and one-half miles per hour. Boats may also be used for several miles up the north fork.

This fork of Bush river which carries fully two-thirds of the water of the river comes from almost due north, and with its many confluent rises in the very heart of the main range of the Rockies, and obtains its waters from the huge ice-fields of the Columbia, Bryce and Lyell groups. The south fork is a narrow stream, about thirty feet wide at its mouth, and comes roaring from the southeast through narrow canyons over which it is almost possible for a man to jump. About a mile from the forks there is a fine fall of nearly twenty feet. The south fork drains the western slope of the Freshfield group.

Station 'XXIX A' was established on Yellow mountain (elevation 8,178 feet) lying immediately east of the forks, and commanding an unobstructed view down Bush river. The station was marked in a permanent manner with the customary brass bolt, set in a hole drilled in the rock and fixed by cement. The head of the bolt is stamped with the number of the station 'XXIX A' followed by a triangle, '△.' The apex of the triangle faces to the north at the centre of the head of the bolt, and is the geodetic point. Three iron reference bolts were also cemented in holes drilled in the rock. Each bolt is distant six feet from the geodetic point, and they bear east, south, and west respectively from it. Directly over the brass bolt a conical stone cairn was built, five feet in diameter at the base and seven feet high. The top of the cairn is vertically above the geodetic point. A band of white cotton was wound around the cairn about a foot from the top to serve as a signal.

The ascent of Yellow mountain was made by going up the bank of the south fork for a mile and a half and then climbing the southwesterly slope of the mountain, through *brulé* and windfall. No hard climbing was encountered, but we were without water for twelve hours. From Yellow mountain a magnificent view is obtained of some of the loftiest peaks on the summit of the Rockies—Freshfield, Lyell, Alexandria, Bryce and Columbia.

I also established a reference station in Bush valley, (elevation 2,500 feet) on the right or north bank of the river, about a mile and a half below the forks. This station is marked by a cedar post five inches square and four feet long. The post is situated in a cleared space, ten feet from the bank of the river and eight feet above the level of the water. The post is marked 'Sta. XXIX B' on one side and on another side 'Triangulation Survey in British Columbia.' From this station I observed angles on stations 'XXVIII,' 'XXIX A' and 'XXX B.'

The timber in the vicinity of Bush river forks is not very good, being mostly burnt. Game is plentiful, black and grizzly bear, goat, caribou, deer and marten. There are very few fish in the river, but in a small lake a mile below the forks, and lying between the river and the mountains to the south, we caught magnificent trout, some weighing fully five pounds.

The return to Bush river was easily made the water being much lower than when we ascended the river. The trip occupied nine days, from September 18 to 21, on three of which it rained. Each morning a heavy mist filled the valley and was not dispersed by the sun until nearly eleven o'clock. The presence of this morning mist, however, I soon learned was an augury of a fine day.

#### STATION XXIX (BUSH RIVER.)

From Bush river crossing I again ascended to station 'XXIX,' (elevation 8,100 feet), and observed angles on stations 'XXIX A,' 'XXVIII,' 'XXIII,' 'XXX A,' 'XXX,' 'XXX B,' 'XXX C' and 'XXX D.' Very disagreeable snowy weather overtook us for several days, from September 25 to 29, during our occupation of station 'XXIX,'

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## STATION XXVIII (BLACKWATER).

Returning by the Donald trail, I branched off at Blackwater lake, and again visited station 'XXVIII,' (elevation 8,940 feet) observing angles between stations 'XIX,' 'XXIII,' 'XXX A,' 'XXX,' 'XXX D,' 'XXX E,' 'XXX B,' 'XXIX,' 'XXIX B,' and 'XXIX A.' During the occupation of this station, October 3 and 4, we suffered from cold and snow, and the angle readings were made under very disagreeable conditions. At our flying camp near timber line of Blackwater mountain, a grizzly bear spent a night within a hundred feet of our tent, sniffing at the fire. When we left camp before daybreak we passed within a few feet of where he lay. He sprang up at our approach, and greatly to our relief, galloped off up the mountain side.

On our return to Donald, I sent the packer with the horses to their winter range, twenty-nine miles south of Golden, and shipped the outfit by rail to Ross Peak water tank, at the mouth of Cougar creek, in the Illecillewaet valley. There I made a survey connecting the Drumlunnon and Skookum mineral claims to the Dominion system of surveys, for which survey I received instructions dated May 13. I also made a visit to the Nakimu caves, and under the guidance of Charles Deutschman, explored some of the nethermost regions of those wonderful subterranean vaults. While I have no new theories to advance regarding the formation, age, or extent of the caves, it nevertheless seems to me, judging from the volume of water flowing in the subterranean torrent near 'The Turbine' and 'The Bridal Chamber,' and comparing it with the quantity which flows into the Illecillewaet via Cougar creek, that there must be some other undiscovered exit for the water, but in what direction I know not.

## ANGLE READING.

The instrument used for observing angles at the triangulation stations is a direction theodolite, made from a special design by Messrs. T. Cooke and Sons, York, England. The telescope has a focal length of 15.5 inches, and the objective a clear aperture of 2 inches; the eyepiece mostly used has a magnifying power of thirty diameters. The six-inch horizontal circle is graduated to 0.25 degrees, and the readings are made by two micrometer microscopes of high magnifying power, with two parallel vertical spider wires. Five revolutions of the micrometer correspond to one division of the horizontal circle, and therefore one revolution is equal to 0.05 degrees. The milled head of the micrometer is divided into fifty divisions, and therefore one division is equal to 0.001 degrees, or 3.6 seconds of arc. The observer can interpolate to parts of a division.

Horizontal angles are read by the direction method, in most cases closing again on the horizon. Four complete sets of readings are made, with telescope direct and reversed, and motion forward and back. Between each set the horizontal plate is shifted 45 degrees to minimize the effect of periodic errors of graduation. To obviate the necessity of determining the run of the micrometer screw, the pointing on the first station in each set is made to differ from the previous pointing on the same station by one revolution of the milled head. For example, if the reading on the first station in the first set be 0.00 degrees with 0 revolutions, the pointing on the same station for the second set is made 45.00 degrees with one revolution; for the third set 90.00 degrees with two revolutions; and for the fourth set 135.00 degrees with three revolutions. By this means the same part of the micrometer screw is used at each station, and run of the screw practically reduced to zero. Both forward and backward motions of the micrometer are read on the graduations of the horizontal circle adjacent to the centre of the comb scale, and the mean of the forward and backward readings taken, the discrepancy between them being supposed to result from error in bisection. By closing on the horizon accidental errors can be traced either to errors in pointing on the signals, or to accidental movement of the instrument during the observation.



In the majority of cases the simple triangles were adjusted by the ordinary method, although where a series took the form of a quadrilateral with the angles between the diagonals also read, the rigorous quadrilateral adjustment described by Johnson in his 'Theory and Practice of Surveying' (page 549) was used. This triangulation being merely of a secondary nature, and intended for practical purposes only, the refinements of primary triangulation have not been resorted to. The horizontal angles have not been reduced to what they would have been if the stations observed upon had been at sea-level, as the reduction is very small, and the calculations for the lengths of the sides of the triangles have been made for plane and not for spherical triangles.

The theodolite is mounted on a short tripod, about two feet high, rigidly braced with cross-pieces screwed to the legs and the metal-mounted points of the legs were set in small holes chiselled in the solid rock at the station. At stations where the instrument could not conveniently be set directly over the geodetic point the distance and direction from the instrument to the geodetic point were carefully measured, and the observed angles were reduced to the true centre.

Owing to the exposed nature of the mountain peaks on which nearly all the triangulation stations are situated great difficulties to satisfactory observing are encountered. It is out of the question to erect elaborate shelters for observing, nor can heliotropes or night signals be used. The season for occupying stations of high elevations is very short, and only a limited time can be spent in observing. Owing to the uncertainty of the weather the motto to be followed in most cases is 'carpe diem.' Early mornings or evenings are the best times for observing horizontal angles, but when from three to six hours of the morning are spent in ascending from timber line to the summit, and several hours must be held in reserve for the descent in the evening, the part of the day best suited for observing is thus lost, and angles must perforce be read when atmospheric disturbances are at their greatest. At the summits, too, it is well-nigh impossible to effectively protect the instrument from the sun and wind.

Before commencing to read the horizontal angles at any station it is advisable to look for each station to be observed upon, in order that no time should be lost in finding the signals during the actual observing. Rapidity of observing is an important factor when combined with careful setting, and as little time as possible should elapse during the reading of a set of angles. When, however, a signal is temporarily obscured by a passing cloud it is a momentous question to decide whether to omit the invisible station and go on with the rest of the set (afterwards to fill in that station), or to wait until the signal can be sighted upon and risk the probability of an accidental movement of the instrument.

The lengths of the sights in this triangulation are from fifteen to twenty-five miles, and with the telescope of the Cooke theodolite excellent bisections can be made upon conical stone cairns from six to eight feet high. When a cairn on a distant mountain peak stands against the sky-line the pointed top of the dark mass of the cairn can easily be sighted upon, but where pointing is made from a high to a lower mountain, and the distant cairn has a dark background, the assistance of a band of white cotton wound around the cairn about a foot from the top has been found most serviceable. Tin signals in the form of truncated cones placed on the top of the cairn have not been satisfactory. Only on rare occasions was reflected light received from these signals, and never from more than one at a time. The tin, too, becomes rusted after a season's exposure. With the cairns for signals no correction for phase is necessary.

By means of the attached vertical circle on the theodolite the elevations of the triangulation stations and other reference points were read at or shortly after noon, when the irregular effect of refraction is at a minimum. As simultaneous reciprocal

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observations cannot be made the calculations for height have to be made by the method of observations at one station only. No satisfactory determinations of high elevations were obtained by the use of aneroids.

## GENERAL NOTES.

The winter of 1907-8 in the mountainous Kootenay district was fairly cold with an average amount of snow. The early spring was fine, but turned cold and wet during May. In the Columbia valley during the month of June the weather was changeable, eleven days being fair, sixteen days rainy, and three cloudy. The month of July was mostly fine in the Columbia and Blaeberry valleys, with sixteen fair days, four cloudy days and eleven days of rain, being mostly scattered showers. On the fine days intense heat prevailed in the middle of the day. August was an exceptionally fine month, especially when contrasted with the same month of 1907. Very little rain fell in the main range of the Rockies, and of the first sixteen days of the month thirteen were fair and three cloudy. The result of this fine weather, however, may be seen in the disastrous forest fires which occurred in the early part of August. In the Selkirks during the latter half of the month, six days were fair, eight rainy, and one day cloudy. On the fine days the smoke from bush fires was very troublesome. During September, in the Bush river valley, there were thirteen fair days, six cloudy and eleven days of rain. In October in the Illecillewaet valley of the Selkirks, cloudy weather prevailed, with only nine fair days. Permanent snow fell at Glacier House about October 21.

The water of the main streams during the summer of 1908 rose only to an average level. The mosquito plague was as bad as usual and seemed to begin earlier. We were fortunate in escaping the worst of that terrible scourge by a timely arrangement of our visits to the different localities. The crops in the Columbia valley in 1908 were fairly good, and fruit growing is developing rapidly, although the small fruits do not ripen sufficiently early to catch the first market, probably on account of the high elevation of the lands throughout the Columbia valley (average elevation, 2,500 feet). The fruit, when at maturity, however, is large and of excellent flavour. There has been no recent mining activity of great moment in this district, unless the probable development of some mica properties in the Selkirks.

I have the honour to be, sir,  
Your obedient servant,

P. A. CARSON, D.L.S.

## APPENDIX No. 19.

## REPORT OF WM. CHRISTIE, D.L.S.

## SURVEYS AND RESURVEYS IN NORTHERN MANITOBA.

CHESLEY, ONTARIO, Nov. 25, 1908.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on my survey operations in the province of Manitoba during the past season, performed in accordance with your instructions dated April 7, May 8, and August 4, 1908.

On April 27 I started for Winnipegosis to arrange to have some repairs made to the boat which I used last year and with which I was to begin this season's work. My first work was the investigation of an error in the closing of the ninth base line across lake Winnipegosis.

On reaching Dauphin I met Captain Coffey, manager of the Northwest Fish company, in whose care the boat had been left, and arranged with him to look after the repairing of the boat, while I proceeded to Winnipeg to organize the party. From the captain I also learned that lake Winnipegosis was not likely to be clear of ice for three weeks at least.

After ordering supplies and attending to some minor details of my organization, I went to Teulon, where my camp outfit was stored, and had it shipped to Winnipegosis.

Returning to Winnipeg I completed my organization and on May 11 went with my party to Winnipegosis.

It was not until May 18, however, that the lake was sufficiently clear of ice to allow us to cross to Mr. Adam's ranch on the east shore of the lake in township 32, range 16, west of the principal meridian.

From here I proceeded to establish a connection between the eighth and ninth base lines by running a trial line north from the northeast corner of township 31, range 16. It was found on completing this connection that the error lay somewhere to the east of range 16.

Following your instructions my next step was to establish a connection between the eighth and ninth base lines by running the east boundary of range 10 between the two bases. Accordingly we started on May 30 to move across, by way of Waterhen river, lake Waterhen and lake Manitoba, to the east shore of lake Manitoba. With a favourable wind this distance could be covered with a sailboat in two days, but owing to contrary winds it took five days, so that it was June 4 when we camped on the east shore of lake Manitoba in township 29, range 10. By June 20 we had completed this connection, having surveyed the east boundaries of townships 29 and 30 and the south four miles of the east boundary of township 31, range 10, west of the principal meridian. This connection indicated that the error lay to the west of this meridian. Fairford river, which is the outlet of lake Manitoba, flowing in a northeasterly direction, crosses the line in section 24, township 30. The surface is nearly level and only a few feet above the level of the lake. Muskegs and hay sloughs are quite numerous



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south of the river, but none were crossed by the line north of the river. A considerable quantity of hay, however, could be obtained around Pineimuto lake in township 31, range 9.

Fairford Indian reserve, No. 50, lying on the south bank of Fairford river, is crossed by the line. I was unable to find any monuments marking the outline of the reserve, but I was shown the approximate position of the line, and I erected no monument within the reserve.

The Hudson's Bay company have a post at Fairford. There is also an Anglican mission and school.

Most of the Indians and halfbreeds keep a few head of stock, and grow a few potatoes and other vegetables which appear to do well. During the winter they engage in fishing and trapping.

After being delayed a few days having some necessary repairs made to the boat we started on June 25 to move around Peonan point to the mouth of Boggy creek, at the north end of lake Manitoba on the ninth base line in range 13. On June 29 I began a retracement of this line. It was retraced across ranges 10, 11, 12, 13 and part of 14 where an error of nearly six chains was found in the north boundary of section 32. From this point I resurveyed the line west across the remainder of range 14 and range 15. The error in closing at the northeast corner of township 32, range 16, was still sixteen chains and sixteen links.

The country along the ninth base line has already been described and I will add nothing further here.

I next moved down to the eighth base line to check the connection across lake Manitoba in ranges 11 and 12. Here an error of seventeen chains and seventy-one links was found. This accounted for the error in closing of the ninth base line across lake Winnipegosis, but showed at the time that a large error existed somewhere to the south.

My next step was to move around to lake Winnipegosis and complete the resurvey of the ninth base line across ranges 16 and 17 as far as the west shore of Salt point, i.e., to the east shore of lake Winnipegosis proper. This was completed on July 24.

As I had no instructions for any further work I returned to Winnipegosis on July 25 and telegraphed you for further instructions.

On July 27 I received your telegram instructing me to establish the east boundary of range 17 between the ninth and tenth base lines and the tenth base line in ranges 16 and 17. This was followed by further instructions to make a connection across lake Manitoba on the seventh base line, and to survey the east boundaries of townships 32 and 31, range 16, west of the principal meridian.

After replenishing my stock of supplies I moved camp on July 28 to the east shore of Salt point in township 33, range 16, and on July 29 began the survey of the east boundary of range 17 north from the ninth base line. By September 5 I had completed the east boundary of range 17 to the tenth base line, and that portion of the tenth base line in ranges 16 and 17 between Waterhen and Winnipegosis lakes. As the iron posts required for these lines had not arrived up to the time of the completion of this part of the survey, temporary wooden ones were put in, and I returned later and put in the iron posts.

The country passed through by these lines is almost level and many large muskegs and swamps are crossed. In townships 33 and 34 considerable hay land is crossed. Farther north also in township 32, large quantities of hay can be cut. I would consider this a good stock raising locality. Very little hay land occurs in townships 35 and 36. The dry land between the swamps and muskegs is covered chiefly with small poplar, spruce and willow with old brûlé in many places. Very little timber of milling size occurs along the line. Nearer the shore of lake Winnipegosis, however, which is from one-half to four miles west of the line, several bunches of larger spruce may be seen from the lake.

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The alkaline water from which Salt point derives its name is confined to a narrow strip along the east side of the point, in townships 32 and 33. The water everywhere else along the line is fresh.

On September 7, I started south to make the connection across lake Manitoba on the seventh base line, and on September 9 camped on the west shore of lake Manitoba, in section 31, township 24, range 10, west of the principal meridian. On September 15 I completed this connection, having been delayed a day on account of smoke which was so thick that it was impossible to see across the lake. Here an error of nine chains and sixty links was found, the distance between the quarter section corner on the north boundary of section 36, township 24, range 10, and that on the north boundary of section 33, township 24, range 9, being nine chains and sixty links too great.

On September 16 I moved camp up to the mouth of Waterhen river, and on the 17th began the survey of the east boundary of township 32, range 16. By September 30 the east boundaries of townships 32 and 31 were completed and the jog at the correction line measured.

This meridian lies on an isthmus from two to five miles wide between lake Winnipegosis on the west and Waterhen river and lake Manitoba on the east. The surface is almost level and is covered chiefly with second growth poplar and willow with *brulé*. Some small hay meadows are crossed in sections 12 and 1, township 31. There is also considerable hay land along the shores of both lakes Winnipegosis and Manitoba.

On October 1, I moved camp up Waterhen river across lake Waterhen and camped on the west shore of the lake in section 1, township 37, range 16, and on the following day began putting the iron posts in the tenth base line in ranges 16 and 17 and the east boundary of range 17 between the tenth and ninth bases. This work was completed and we were back at Winnipegosis on the night of October 3 (Saturday). On Monday I discharged my party and they left the same evening for Winnipeg. Next day I completed arrangements for the wintering of the boat and attended to a few other details incidental to the closing of operations and left on the 8th for Winnipeg, arriving there on the 9th. The same evening I went to Teulon and arranged with Mr. McKinnell to winter the horses which had been in his charge since last January. On October 10 I returned to Winnipeg and left the same evening, arriving home on the 13th

I have the honour to be, sir:

Your obedient servant,

WM. CHRISTIE, D.L.S.

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## APPENDIX No. 20.

## REPORT OF T. A. DAVIES, D.L.S.

RETRACEMENT AND SUBDIVISION SURVEYS IN SOUTHWESTERN ALBERTA.

OTTAWA, February 26, 1909.

E DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I beg to submit the following general report on retracement and subdivision surveys during the season of 1908.

Having received instructions to make a retracement and restoration survey of that part of the fifth meridian between the northeast corner of section 24, township 4, range 1 and the third base line, I left Ottawa on April 27, for Edmonton where I procured my outfit of the previous season. I then proceeded to Macleod.

From Macleod I started, with the outfit, to drive to township 4, range 1, west of the fifth meridian, and arrived at the town of Pincher Creek on the first day. That night a heavy rain began and continued for four days putting the trails in an exceptionally bad condition.

On May 15, I arrived at the place where work was to be commenced. The following morning the northeast corner of section 24, township 4, range 1 was located. Further work, however, was impossible on account of heavy rain. On May 18, the rain stopped and work was begun again.

During the latter part of May and the first two weeks in June rain fell almost continuously. Pincher creek was swollen so much that many of the fords were impassable. Under these conditions anything like satisfactory progress was out of the question.

The country on either side of the meridian through townships 4 and 5 and one mile into township 6 is hilly, generally open, with occasional clumps of poplar and willow brush or scattered spruce and pine. As this line is close to the mountains the nights there through the summer are cold and frost is likely to occur.

Cattle and horse ranching is the principal occupation in this part and throughout all the country where surveys were carried on.

Hay, both wild and cultivated, is cut from the land in the neighbourhood of Pincher creek, then baled and drawn into the town of that name. Grain also is grown over a district comprising the country two and three miles south of the railroad and from Pincher Creek west to Cowley.

North of the Crowsnest Pass branch of the Canadian Pacific railway the meridian passes over a rolling prairie broken by coulées and the valley of Oldman river. An iron bridge built recently across this river gives access to the railroad from the country on the north.

On June 25, the work on the meridian was completed and the following day we moved along a good wagon trail into township 9, range 30 west of the fourth meridian where I was to complete the subdivision begun by Mr. C. C. Smith, D.L.S., in 1907, and to retrace that part of the north boundary of the Peigan timber reserve affected by the subdivision.

Having retraced Mr. Smith's lines and finding that my work agreed with his the lines were mounded according to instructions.

The township is rough and hilly and almost covered with fir, spruce, balsam, pine and poplar, averaging from four inches to two feet in diameter. Openings are very few and small. Settlers had not come into that part of the township to the west

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of Beaver creek valley, which extends along the eastern tier of sections. Those in this valley are occupied with cattle ranching. Having finished this work and surveyed four miles of line in township 9, range 29, west of the fourth meridian which I had been instructed to do we moved along a trail going southwest across the Porcupine hills to meet the main wagon road to Frank. From here a trail following the railroad to Lille led us into townships 8, ranges 3 and 4, west of the fifth meridian where the next work was to be done.

Township 8, range 4 and that part of township 8, range 3, to the west of the Livingstone range of mountains, is very rough and mountainous, densely timbered with spruce and fir, from six inches to two feet in diameter, jackpine and poplar. Many of the sidehills are covered with windfall and underbrush.

One settler had located in the western part of section 13, township 8, range 4.

On August 27, all the work that was practicable was finished and we moved to the eastern side of the Livingstone range to complete as much as was required of the subdivision of townships 8, 9 and 10, range 3, west of the fifth meridian.

A good wagon road leaving the main trail between Lundbreck and Frank follows the east boundary of townships 7 and 8, range 3.

The country along the eastern side of the range changes from level to a rolling and hilly surface. The level parts are frequently marshy ground covered with willow brush and second growth poplar. The rolling and hilly parts have scattered clumps of poplar and willow brush.

Wood for fuel can be obtained from the slopes of the range. Toward the end of September, and during the first half of October two snowstorms occurred. Eighteen inches of snow fell in both instances.

The work in these townships was finished on October 22, and we then moved north into townships 12 and 13, range 3, west of the fifth meridian, to complete as far as was practicable the survey of certain coal lands there.

A good wagon road follows Oldman river through the 'gap' in the Livingstone range and then north along the valley of Livingstone river as far as section 6 in township 12. A wagon trail continues on as far as the north boundary of township 12, but is in poor condition.

It was not possible to go east from the Livingstone valley with wagons. I therefore made arrangements with Mr. M. Bolton, a rancher in section 6, township 12, to pack the outfit, while the work was going on. A considerable amount of trail cutting was necessary to keep the camp as close as possible to the work. The country is mountainous and rough, timbered, for the greater part, with spruce, balsam, pine and poplar from three inches to two feet in diameter. The northeast slopes of the mountains are generally covered with windfall and underbrush. The summits of the hills are in most cases open country as are a few of the sidehills.

The two principal creeks of these townships are Whites creek and Falls creek, so called from the succession of small falls near its junction with Livingstone river. Hay grows plentifully enough for grazing purposes in the valleys of these two creeks.

Tracks of the different kinds of game, such as deer, lynx, bear, coyotes, rabbit, a few marten, partridge, grouse and ptarmigan gave evidence of their existence in the country.

On December 20, instructions were received telling me to close operations for the season. I, therefore, put the lines run in such a condition that they could be taken up again without interruption.

The necessity of packing ended, the wagons were loaded and drawn to the town of Pincher Creek and thence to Mr. R. Duthie's ranch, about eight miles south of the town, where the outfit was left for wintering. I then returned to Pincher and boarded the train for Ottawa.

I have the honour to be, Sir,

Your obedient servant,

T. A. DAVIES, D.L.S.

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## APPENDIX No. 21.

## REPORT OF W. J. DEANS, D.L.S

MISCELLANEOUS SURVEYS IN SASKATCHEWAN AND MANITOBA.

BRANDON, MAN., February 22, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of my survey operations during the season of 1908, in the provinces of Saskatchewan and Manitoba.

Having received your instructions, dated May 13, in reference to miscellaneous surveys required in the province of Manitoba, I commenced at once making preparations for the season's work, but for various reasons, it was June 8 before I left Brandon with my assistants and party for Kamsack, at which place I left the horses and outfit which I had used the previous season. The Doukhobor with whom I had left the horses had taken great care of them and had all in excellent condition.

Just before leaving Brandon, I received instructions to make a correction survey in township 24, range 30, west of the principal meridian. The instructions stated that this work was required first, so, having got my outfit together and sufficient supplies for some time, I left Kamsack on June 13 to make this survey.

The original subdivision of this township is very irregular, particularly in the northwest quarter. I ran the various lines to correct the survey and made traverses of improvements acquired by reason of the change and valued the same. The settlers on section 30 adjusted the question of compensation among themselves, but not until I had made traverses of improvements. These men are well pleased and glad to have this matter settled. The settlers on section 20 are all satisfied with the new survey and the amount of compensation received for improvements lost. It was assumed that the owner of section 31 would not object to deeding the Greek Roumanian Catholic church, the property occupied by them, and which was thrown into the south-east quarter of his quarter section by the correction survey. This assumption, however, proved to be incorrect and as a consequence the boundaries of sections 31 and 32 are as in the original subdivision. All the settlers on section 32 appear to be satisfied to have the boundaries remain unchanged, so that this whole matter would seem now to be satisfactorily adjusted.

The Canadian Northern Railway company are building a line which will pass through this township and give the settlers the advantages enjoyed by communities having railway connection.

On June 29, I started for township 23, range 26, west of the principal meridian. My work in this township consisted in laying out section 6. Before I could do this, however, it was necessary to re-establish the north boundary of sections 35 and 36 in township 22, range 27, west of the principal meridian. This part of the country appears to be in a very prosperous condition, as many new farm buildings were in course of erection and road improvements were general.

On July 6, I started for Grandview. I had intended to reach this place by the colonization road across the Riding mountains, but I found it in an almost impassable condition and concluded that it would be much better to go by way of Asessippi and

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Roblin. On July 9, I arrived at Grandview, and on the 10th moved camp to section 27, township 26, range 24. I immediately proceeded to carry out the surveys required in this township. While working in this place the mosquitoes were very bad, rain also interfered and delayed the work. I finished here on July 20, and next day started for Ethelbert, arriving there on the 24th.

On July 25, I moved camp to township 30, range 21. My work in this part consisted in retracing the south boundary of township 31, measuring the meridian, closing distances and obtaining the azimuths. This township is very low and wet and the trails are very bad, even in midsummer.

On August 3, I moved camp to Ethelbert and after getting supplies and making some inquiries about trails, we proceeded to section 12, township 29, range 23. My work in this township was to lay out the easterly tier of sections. These sections adjoin the Duck Mountain forest reserve. The surface is generally level and covered with a thick growth of timber and scrub with small clearances in places. There are a number of settlers on these sections who have made good progress in clearing up the land and getting it under cultivation. Wild raspberries are very plentiful along the easterly slope of Duck mountains; the settlers gather great quantities and dispose of them to the merchants in Ethelbert, who ship to Winnipeg and Brandon where the fruit commands a good price. On August 22, I finished the work in township 30, range 23, and started for Fork river by way of Ethelbert, passing through a low wet country covered with yellow scrub. The trails through this part are very numerous but none are much travelled and they appear to have no definite destination. The whole of the country between Ethelbert and lake Winnipegosis is low and flat with numerous hay marshes, separated by stony ridges. The settlers are principally Galicians, who are engaged in mixed farming. The great need of this part is drainage; a large number of settlers are abandoning their homesteads because they are unable to work the land early enough in the spring on account of water.

In township 23, range 18, I retraced the east boundaries of sections 25 and 36, also the north boundary of section 36 and traversed Dauphin lake through these sections. This completed my work in this township and on September 1 I started for township 23, range 20, passing through the town of Dauphin on the way. I arrived in township 23 on September 2, and completed the work on September 4, and next day moved camp to township 23, range 21. I completed the work there on September 9.

Having received instructions in July to make a retracement and restoration survey of township 22, range 11, I now made a start for that township, passing through Dauphin, Ochre River and Makinak on the way. At this latter place we left the railway and struck east through Ste. Rose du Lac, travelling over graded roads through a well settled and prosperous country. About eight miles east of Ste. Rose du Lac, settlement ends, and the country becomes low and wet with many extensive hay marshes and sloughs. The trail to Kinosota is but little used, only an occasional traveller or Indian passing that way, and as it runs through bush for eight or ten miles, I found that I had undertaken quite a task in attempting to reach Kinosota by this trail, but by sending men ahead with axes to clear away the fallen trees, we made fairly good progress through the bush. We arrived at Kinosota on September 16.

On September 18, I started work in township 22, range 11. This township was subdivided in 1886 and as the marks were wooden posts and bearing trees which were difficult to find on account of the lines having grown up and the posts rotted down, settlers were unable to determine where their lines were and hesitated to make improvements until their boundaries were correctly defined. A number of settlers have recently taken up land in the township expecting a railway in the near future, which is in course of construction and has now reached Sandy bay. The proximity of lake Manitoba makes this township a very desirable location for settlers as the lake is rich in fish, which affords profitable and agreeable work in winter time.

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On September 25, a great storm started; the wind blew a hurricane and rain came down in torrents. This storm lasted five days and did great damage to the shipping on the lake. The Hudson's Bay company lost all their supplies which were in transit at the time. This mishap caused me a great deal of inconvenience as I was largely depending on the company for supplies, which were now at the bottom of the lake.

In October I received your instructions in reference to making a restoration survey in township 23, range 11. In the original subdivision of this township, the south boundary was not run, the subdivision lines being connected with the north boundary of township 22. I therefore ran this line and marked it in the usual way. The lines in the rear of the lake lots had never been run, the surveyor running only the section lines. I therefore ran lines in the rear of the lots marking the boundaries as on a correction line. The settlers in this township were very pleased to have their lines run as there was much uncertainty in regard to the boundaries.

On December 1 and 2 I surveyed section 6, in township 23, range 10, Roderick Flett has a homestead entry for the southeast fractional quarter of this section. He was under the impression that a number of squatters were on his fraction. I found that he himself was not on the land for which he had an entry.

On December 5, I completed all of the work in this part and on the 7th stored the outfit and left the horses with Robert De Charm who had agreed to winter them. I then hired one sleigh and a sleigh and team, and started with the men for Brandon, via Westbourne. I arrived at Brandon on December 9, and paid off the assistants and men next day.

On December 14, I started for Langenburg to carry out your instructions in reference to the correction survey in township 24, range 30, west of the principal meridian. I finished this work and returned to Brandon on December 22.

The work on which I was engaged last season consisted principally of small surveys scattered over a large extent of country. To carry out these surveys it was necessary for me to drive more than five hundred miles and often delays were caused in starting a survey through inability to find the starting point and get the necessary observation.

The new posts in my opinion are much better than the old ones. The material is superior, the shape is such that settlers will be unable to make use of it, and when placed in the ground it is difficult to turn and so it will stay in the position placed by the surveyor.

I have the honour to be, Sir,

Your obedient servant,

W. J. DEANS, D.L.S.



## APPENDIX No. 22.

## REPORT OF THOMAS FAWCETT, D. T. S.

RESURVEY OF PART OF THE FOURTH MERIDIAN AND MISCELLANEOUS SURVEYS IN ALBERTA AND SASKATCHEWAN.

NIAGARA FALLS, ONT., January 7, 1909.

E. DEVILLE, ESQ., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—In accordance with your instructions for the retracement of the fourth meridian, and of the several correction surveys assigned me during the past season, I have the honour to submit the following report:

Leaving home on June 13, I proceeded to Toronto where I was joined by Mr. Paul B. Street, a student surveyor, who had been appointed by the department as my assistant and together we proceeded to the west, reaching Lacombe, Alberta, five days later. At that point I took over four horses which had been left in charge of Mr. Sam. Godfrey by Mr. A. Hawkins, D.L.S., procured a part of my outfit and men and then went on to Hardisty, leaving Mr. Street and the men from that point to travel across country to the intersection of the fourth meridian with Red Deer river, near which point we expected to begin the retracement. The country travelled over by this section of my party was for nearly a hundred miles saturated with water as a result of the continuous heavy rains which began about June 1, and continued the greater part of that month. So difficult was the travelling that even with four horses attached to a light load, the speed made was very slow, bridges having to be built, muskegs brushed, loads taken off the wagon, carried ahead and reloaded, this operation having to be repeated several times. The road followed the Lacombe-Moosejaw branch of the Canadian Pacific railway closely until Stettler was reached. The party suffered a delay the first day out through an accident. The cook, who evidently was not an expert axeman, in cutting wood for his camp fire, cut an artery in his foot, had to be taken to the nearest station, put aboard the train and sent home to Lacombe. Another man was taken on to fill the vacancy, but that left the party without an experienced cook, which is always a disadvantage. The wet road continued until a point east of Sullivan lake was reached; then the whole aspect was changed, and instead of travelling through water and muskegs all the day long it was not an uncommon thing to travel a whole day without seeing any water, good, bad or indifferent. This condition was harder on the animals than the other. About that time (the last week in June) a deluge of mosquitoes came from somewhere and made life a hard fought battle with some uncertainty as to which party should belong the victory. This condition fortunately did not continue more than two weeks, or the little winged insects might have claimed the victory over the quadrupeds and bipeds. At the end of the second week the party arrived at their destination feeling that they had come through great tribulation.

The rainy condition prevailed in the vicinity of Hardisty to the same extent as around Lacombe. This wet weather followed by an unusual warm spell gave the crops a great impetus from which a rapid growth and early maturity might confidently be expected, and from reports received later the return from the ground was very en-



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couraging. Taking the Canadian Pacific railway from Wetaskiwin to Hardisty it is a revelation to anyone who has not been through that country for four or five years to see so many large towns which have sprung up, mushroom-like, but with all the stability of places with years of development to their credit. That part of the country which lies southeast of Edmonton being park-like, groves of timber alternating with open prairie spots, naturally attracts a good class of settlers who fill up such places very rapidly when once its advantages become known. Contented citizens from different parts of the United States comprise a considerable proportion of the population, and those usually come with everything necessary in the way of implements, etc., to develop the country and reap its wealth without any preliminary delays. I mention this great progress in so short a time because I was led to wonder at it, having myself travelled through a great portion of that country, and part of it many times when it would have required the most pronounced optimist to have conceived such rapid development. I reached Hardisty on the evening of June 20 (Saturday evening) when a cold rain, almost sleet, made one huddle around the fire in order to feel comfortable indoors. On Monday morning I procured a livery conveyance and a man to drive me out to Mr. Albro E. Henry's ranch to take over the Government horses and outfit left there by Mr. A. McFee, D.L.S., who had a short time previously surveyed the outlines of a large Government park which was rapidly being fenced and put in readiness for the herd of buffaloes formerly of Yellowstone Park in the United States, but purchased by the Dominion Government to make their homes once more along the banks of Battle river, which not more than a generation ago was a favourite feeding ground for those noble animals, which carelessness and cruelty had permitted to become extinct but which may at some future time become a source of revenue to our country through this transaction on the part of the Dominion Government. The farm where I found the horses adjoins the park and the trail between the railway at Hardisty and that point was at that time alive with teams drawing posts and wire for the contractor who was making a strong permanent fence to keep the animals within their own habitation. Taking over the horses and wagons and having engaged two men to accompany me on the road and to assist with the survey, we started from Hardisty on the evening of June 23, with two wagon loads of provisions and feed for horses. We started in a southerly direction travelling through a hilly country, sparsely settled, following a trail which connects Hardisty with Talbot, about thirty miles south of Hardisty where the country seems to be pretty well occupied and large areas under cultivation. Not far to the east of Talbot the Neutral hills can be seen where the people resort to for building timber and fuel. Bluffs of poplar are scattered through the country until open prairie is reached some distance south of the Neutral hills. In the rolling country passed through the soil to a great extent is a black loam over clay with an occasional outcrop of gravel and boulders. Some twenty miles south of Talbot we reach the unoccupied prairie with surface hilly but water becoming scarce in the ponds. All the way from Hardisty until well south of the Neutral hills the country at the end of June was well supplied with fresh water in ponds and lakelets, while a few miles south of Talbot two nice streams, the Ribstone and a tributary, had to be crossed. We were fortunate in finding a bridge recently completed, otherwise the crossing would have given us considerable trouble and delay, as earlier in the spring the bridges over those streams had been washed away and traffic between Hardisty and the settlement south of the Ribstone had to be suspended. Communication was at that time opened up with Stettler, the town at the terminus of the Lacombe branch of the Canadian Pacific railway.

After travelling some fifty miles southeast from where we crossed the Ribstone we descended a long incline falling about two hundred feet in a distance of one mile to Sounding creek. Along this stream are bunches of willow where travellers can find a supply of fuel. The land north of Sounding creek would be fairly well adapted for agriculture were it not so far from material for building and fuel. When the Moosejaw-Lacombe branch of the Canadian Pacific railway is completed it will open up a

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large country through this district. After leaving Sounding creek we realized that we were travelling through a country where there had been no rain nor snow to amount to anything for many months. The surface is rolling and hilly, yet we drove all day and more than half the next before we came to any water. Beds of ponds and lakes were numerous but dry and the ground baked hard and full of crevices; the grass had attained very little growth and seemed parched and dry. Between Sounding creek and Red Deer river, some fifty odd miles, we discovered only one small pool of water through which the cattle from the ranches to the south had trampled hundreds of times, but as men and horses had been thirty-eight hours without any it was very acceptable. With my two men from Hardisty I reached the valley of Red Deer river on the evening of June 30, having spent a week making the trip, travelling in a direct course after leaving Talbot, striking an occasional survey monument from which the locality could be ascertained. The water in Red Deer river was at a very high stage owing to the heavy rains in the west and north at its source. The Saskatchewan also was very high but falling rapidly. I placed my camp as near the intersection of the fourth meridian with the Red Deer river as I could ascertain from the map and began the search for survey monuments. The high banks of the river on the north side are covered with boulders, and there are numerous stone mounds, so many that they were perplexing and none could be identified as the surveyor's land marks, and the country being full of ravines and broken banks one might pass within a few yards of a survey mark without seeing it. Inquiries from the few ranchers I met brought no information as they professed to know nothing whatever about any survey marks and I formed a very strong opinion that many of the original land marks had been removed or obliterated for a purpose. The country has been used exclusively for ranching purposes except for the raising of a few vegetables and oats for feed and local use, and the disappearance of all the land marks would prevent settlement for other purposes. Notwithstanding my long experience I searched for three days before I found a post that I could identify, and that was ten miles north from the river. It was sufficient to enable me to locate the meridian which when once found something remained to indicate where the original monuments had been, and the line was easily followed but few traces of original posts remained. Sometimes a point of wood could be found and iron posts at several township corners, but section posts seemed to have disappeared entirely. On Saturday, July 4, the contingent from Lacombe arrived at camp and on Monday morning following we began the work of retracement at the point formerly located in township 25 and reached the Red Deer on Wednesday. For the purpose of carrying the line across the river I had taken my canvas boat from home, otherwise I would have had great difficulty in carrying on this part of my work owing to the high water and strong current. I had contemplated building a raft of dry logs to ship my wagons over but learning that a ferry was in operation thirty miles down the Saskatchewan I considered it the safer plan to send the teams and bulk of the outfit around, using the boat to cross the Red Deer. On the point of ground between the Red Deer and Saskatchewan I found a half-breed rancher and engaged him with his team to draw my boat and camp outfit across the point to the Saskatchewan. The point of land is mostly a clayey or sandy loam with a friable clay subsoil and would be well adapted to grow grain or vegetables if moisture were sufficient, but there seems to be a deficiency of rainfall and the land lies at too high an elevation to use water from the river. From Red Deer river to within a mile from the Saskatchewan there is a gradual increase in elevation to about three hundred feet above the river after which it descends rapidly to the Saskatchewan. Along both these streams there are flats covered with timber, in some places large cotton wood or rough bark poplar attaining not unusually a diameter of three feet. After crossing the Saskatchewan we crossed over a sandy flat and then made a gradual rise for two miles to the second crossing in section 13, township 22. The descent to this crossing is very steep with broken cut banks and ravines with clay and some

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boulders. We tracked our boat around to the point of this crossing, the current being too swift to make any headway rowing. The second point of land along the Saskatchewan is composed of drift sand with very little vegetation extending west from the line about half a mile and east to the river. Slight traces of the line could be found across this point. The third crossing of the Saskatchewan is in section 1, the township corner being marked with a witness post on the south bank of the stream. From here after several ups and downs we reached an altitude of some six hundred feet on the bench and left the river which bears away in a south-westerly direction to Medicine Hat. On the evening of the third day the teams and outfit arrived at the river and accompanied the line party from here all the way down. The land for the next ten or twelve miles is mostly a light sand which in some places seems to have drifted over clay ground, clay outcrop through the sand being seen in spots. The principal trouble from this on was to find water at convenient points for camping. In township 20, just east of the meridian near the north boundary is the headquarters for Walker's ranch. Here we found a well and a pump driven by a windmill keeping a large tank well filled with excellent water, and there seemed to be no fear of the supply becoming exhausted. The water among the sand hills is usually reached at fifteen or twenty feet below the surface and if a sand point is driven down five or six feet lower there is no danger of the water supply running out. There had been very little rain here in 1907, scarcely any snow last winter and no rain in the spring worth mentioning, which caused all the surface water to vanish, but the vegetable growth appeared much better on the sand than on the clay ground; on the latter the grass was stunted and dry while on the sand it was still green. Mr. Walker had a garden with vegetables, potatoes, &c., which gave promise of a fair crop. Moisture seemed to penetrate through the sandy land when it would simply be labour spent in vain to try any crop on the clay ground. The cattle on this ranch were all in good condition and although early for marketing Mr. Walker was taking a bunch of fat steers out to the railway at Walsh for shipment to the east. The next place where water was to be had was Beatty's ranch twelve miles southwest in township 19, some six miles west of the meridian. This was in the sand hills also, and the same conditions prevailed as at Walker's ranch. Through the sand hills there is a little scrub and small patches of timber which in conjunction with the sand hills which extend in no particular direction afford sheltered spots for stock. This year those ranchers find it arduous labour to provide more than enough hay for their working teams and saddle horses. The grass having arrived at a much less growth than usual they naturally look forward to the coming winter with foreboding. Two years ago when there was a very heavy snowstorm, Mr. Walker saved his stock from perishing by running a snow plow from early morning until late at night to uncover the grass so that the cattle could graze, but this invention cannot be depended upon to render much assistance in places or in seasons where the grass is short. The next place where water was found was a lake which crosses the north boundary of township 17 about a mile east of the fourth meridian. The water in the lake itself is bitter and alkaline but in a draw near the southwest corner of the lake is a flowing spring of sparkling clear water. Horses and cattle far distant from any rancher's headquarters come here to drink. There are other springs around the margin of the lake, but the one mentioned is the best. Here the country is rolling and hilly, the soil is generally clay with gravel and boulders on many of the hills. Nine miles farther south we reached another lake crossed by the fourth meridian near the middle of township 16, where water was found in ponds, the greater portion of the beds being dry. Here we found two shepherds with their dogs in charge of three thousand sheep, the property of a company with headquarters at Many Island lake. The sheep had to be guarded day and night against the coyotes or prairie wolves which were ever on the watch to pick up any that might stray to one side. The country here being rolling and hilly is well adapted for grazing land

and many bunches of horses and cattle were seen roving at will over the prairie. Thirteen miles south of this lake we reached Many Island lake, which we found greatly diminished in area since the original survey was made. Instead of five miles across water we crossed only fifteen chains which the chainmen waded. The north side of the lake remained unchanged, but on the south side there is an extensive flat where people were making hay. The grass was coarse and poor in quality, but very acceptable in a year like the present, as it will supply feed for the sheep during the winter. There are several sheep ranches occupying that belt of land lying between the Saskatchewan and Bigstick lake in this latitude. The country covering a belt of fifty miles from the Saskatchewan eastward and twenty miles from the south side of Many Island lake northward, seems to be particularly well adapted for this purpose. The flat country where crossed by the line extends to the north boundary of township 12, a distance of eight miles. For the first few miles the soil is light sand but gradually changes to clay loam and then to a hard sticky clay which when baked by the sun is a regular gunbo. On the south side of the lake we reached a settled country where there are some occupants and some deserted houses. In townships 12 and 13 we found Boxelder creek and MacKay creek, both dry, except in small pools. This had not occurred (so I was informed) since 1892, when there was a great dearth of water all over the provinces. Township 12 is very hilly with intervening valleys and ridges. When water is plentiful in the creeks some of the flats can be irrigated and have been in former years. Many of the hills are composed of gravel with embedded boulders. Across township 11 south of the Canadian Pacific railway the country is nearly level with a substantial clay soil and would be well adapted for agricultural purposes if the water supply were sufficient. Some crops were put in which did not amount to anything this year. The earlier settlers in this part of the country did not count on raising grain in this locality but confined themselves to the stock trade both in horses and cattle. As a usual thing the land is excellent for grazing the grass being rich in nutrient qualities. In townships 11 and 10 there are a number of German settlers who came from the United States, bought lands from the ranchers with the intention of farming but have met with discouragements. The settlers in townships 9, 10, 11 and 12 went to the benches of Cypress hills to cut hay. There was no hay to be had on the low ground, grass on the benches from 600 to 1,000 feet higher being plentiful. The hills were occupied for miles by those ranchers and others from the north country, all making hay. Some of them expect to take their stock up to the hills to winter while those who have not so far to go will draw their feed down in winter as they require it. Near noon on Saturday July 25 as we were nearing the base of Cypress hills in township 9 a great smoke was seen rising from the bench some twelve miles farther south. Fire had escaped from one of the hay-makers who was preparing his midday meal, and several settlers lost their mowers, rakes, wagons and other implements besides what hay they had made. What was worse, a great many acres of valuable timber was destroyed in the ravines and a good many square miles of hay land burned over. Some of the Royal Northwest Mounted Police were soon on hand and all the settlers within accessible distance were ordered out to surround the fire. By hard work it was surrounded and confined to the ravines and timber where it burned itself out. The work of haying had only been in operation a few days so not much of the hay was in stack. To the greater altitude of Cypress hills in comparison with the flats to the north must be attributed the good grass on the benches when it is so poor on the lower ground due principally to the difference in humidity or precipitation, the snowfall being much greater at the higher altitude. Through townships 11, 10 and part of 9 the local governments of the two provinces were constructing a road along the fourth meridian. As there are several deep coulees the district engineer was called upon to survey deviations for the purpose of improving the grades. To find a passable road down to Battle creek it was necessary to deviate a mile west of the meridian to where there is a pass or opening

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through the hills. Along the line where the ascent is made from the north in township 8, there are several ravines with very steep banks, and from the summit at the middle point of section 24 a descent of 700 feet including several ravines, thick scrub and clumps of timber had to be overcome in reaching Battle creek in section 13. For five miles the meridian climbs up and down through deep ravines mostly timbered with spruce and poplar while the ridges are covered with jackpine. There is considerable timber in those ravines and along Battle creek, and a sawmill has been built on the main creek about a mile west of the meridian to which point a wagon road was being constructed from the north, also a road up a ravine to the bench south of Battle creek used by settlers in reaching the hay ground. Soil in the ravines is a dark loam sometimes sandy but on the benches loam for a few inches and underneath gravel and as we proceeded south, many imbedded boulders. Each of the ravines crossed contained a stream of cold clear water which was a great luxury after the dry plain and alkaline water to the north. A stream near the southeast corner of township 7 originates from two springs, one on the road allowance and the other just east of the road allowance and flows from openings in the solid rock, the water being icy cold and pure as could be found anywhere. The stream flowing from these two springs is sufficient to irrigate quite a garden for a rancher named Forsythe who resides on the southeast quarter of section 1 in the township above named. Great heat prevailed during the last week in July and the first week in August. On both the 1st and 5th of August the heat reached the excessive temperature of 108° F. in the shade. On August 1st a hot wind from the southwest in the afternoon seemed to strike anything that remained green with a blight as though stricken with frost so that any crop which might have been cut for green feed was turned into worthless straw in one day. This applies only to that belt lying west of Maple creek east of Medicine Hat and between the Cypress hills and Many Island lake. On that date the timber and towns were burning along the Crowsnest Pass branch of the Canadian Pacific railway. Perhaps the heated winds originated from those fires as they came from that direction. I was driving from camp to Walsh on that date and found the heat most distressing. The hot winds and their effect on the crops was the general topic of conversation around Walsh that evening but I did not hear any one associate it with the bush fires which were at their worst when the winds were most in evidence. At Walsh I received your telegram instructing me to repost the fourth meridian and restore all the monuments. I ordered posts from Winnipeg by express and not finding the spades I required at Medicine Hat I ordered them by wire from Calgary. The posts arrived from Winnipeg on the evening of August 4 and I returned to camp on the 5th and the following day we began restoring the monuments from the northeast corner of township 5 northward. Owing to the long drought and clayey nature of the soil the ground in many places was of an adamant hardness and progress was slow until the sand hills north of Many Island lake were reached when this work was rapidly pushed on to completion. Having completed the restoration of the monuments and posted according to the latest directions the line back to the north boundary of township 24 I continued the restoration north to township 27 to where the monuments had been restored a few years ago when the townships adjoining the meridian were subdivided, completing the work and starting back for Medicine Hat for further instructions on August 28. On September 1, I arrived at Medicine Hat and proceeded by train to Walsh finding there instructions requiring me to discharge my party and proceed with certain correction surveys. I discharged three men retaining three in addition to my assistant until I completed two of the correction surveys which I could most conveniently reach by using my horses and outfit. I therefore left Medicine Hat on the morning of the 3rd, and reached Many Island lake the nearest camping place to where my first correction survey was located, namely the north boundary of township 14, range 30, west of the third meridian, where on September 5, I proceeded to investigate and make the cor-



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rections. On Monday morning, September 7, we started for Bigstick lake reaching that locality on the evening of the 8th. The country around this lake in range 24 where I was required to examine and make a resurvey of the correction line was found to be in the sand hills and many of the original monuments are buried underneath the drifting sand. After searching for some time to try to locate a point on the meridian bounding range 25 on the east and failing to find any monument I got a rancher to point out this mound, which he informed me was at the southeast corner of section 34, in township 14, range 25. From this mound I ran a mile north and then two miles east but failed to find any indication of a surveyor's post or mound. I then returned to the aforesaid mound and ran east finding a mound at the end of eighty-one chains, and another after going a mile farther. This second mound though in a clump of brush, was in fairly good condition and appeared to have been built much larger than the others I had seen and I had an impression that it was on the outline sought. I therefore took an observation at that point, turned off the necessary angle to run a true meridian and retraced the line south to find a post. After running two and a half miles I found an iron post in mound at the northeast corner of section 12, from which I ascertained that the mound which the rancher pointed out as the southeast corner of section 34 was in reality the monument marking the quarters on the east boundary of section 27. Having located myself with reference to the survey monuments I proceeded to retrace the correction line. The field notes will show that a large portion of Bigstick lake is dry this season, but there was no vegetation or growth of any kind on the bed of the lake showing this to be an exceptional year. In running the correction line across range 24 I restored any monuments I found on the ground and established the other corners between these, except those that fell on the bed of the lake or on some shifting sand hill where a few hours wind would cover them from view. While camped near the lake on Sunday night, September 13, an exceedingly hot day, an electric storm came on in the evening and just at dusk I stood on a hill and counted seven fires started by the lightening, two of which were not far away, and the ranchers in the district turned out and worked all night. We also worked all night burning a guard around our tents. Several of the fires ran into sand hills and went out. Towards dawn it turned cold and the others gradually died down and were surrounded and beaten out by the ranchers. Having completed the work here as far as practicable we started on the 15th for Walsh reaching there the next day when the horses and outfit were delivered to Mr. Nesbitt to winter. The other three men were discharged and provided with transportation to their respective homes, while with my assistant I took the midnight train to Lethbridge where I hired a conveyance and started out to investigate a reported error in the east boundary of section 23, township 10, range 22, west of the fourth meridian, which was found and corrected and an agreement entered into by the parties interested to accept the new monument in lieu of the one destroyed. From there we drove to section 24, township 11, range 22, west of the fourth meridian where another discrepancy had been reported. One post we found to be missing, this we had to re-establish but no such discrepancy existed as had been reported and shown on the sketch by the man who reported it. Completing this work on September 19, I returned to Lethbridge on the 20th and took the train for Medicine Hat Monday morning, where I had unfinished business, and took train to Moosejaw next morning to examine into the condition of monuments in township 12, range 1, west of the third meridian, where intending settlers had been unable to find the monuments. Arriving at Moosejaw on the evening of the 22nd I engaged a conveyance to take us to Johnston lake in the aforesaid township. The weather from that time to the end of the month was stormy and cold with daily flurries of snow or rain, and we found it very uncomfortable not having any stove along and no wood except the smallest kind of shrubbery. After locating the third meridian I retraced eighteen miles of the section lines finding all the mounds but only a few posts and where posts were found they were seldom marked, the square tins with numbers

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stamped on when the subdivision was made having disappeared so that it was very difficult to find the location of the sections. There were some land seekers out at the time and I directed them to section 20 along which we were retracing the lines. After a few settlers are located they can direct the new comers, or as is usual some expert in the locality after finding the position of a few points can find the other sections by retracing the lines with a compass. A great many land seekers were on the trail from Moosejaw when we were in that district, usually bound for points near Wood mountain and west where good lands had recently been surveyed. They were rushing to get ahead of others and get their land in advance of a railway which is expected to run through there at an early date. There were many land seekers traveling out via the Canadian Pacific railway now under construction northwest from Moosejaw. The lands office at Moosejaw was certainly a busy place during September and October, also at Lethbridge lands office. I would have had to take my place in the line with some two hundred applicants ahead of me if I had sought admission to record a claim or to enquire about land for the purpose of acquiring it. This was a short period after the lands which had been held as railway lands were thrown open for settlement. Having reported on the condition of the monuments found in township 12, range 1, west of the third meridian, I proceeded to Bladworth to traverse a lake reported in township 28, range 1, west of the third meridian, called by the settlers 'Silver lake.' Thence we went to Saskatoon and took the Grand Trunk Pacific railway at Earl for Neola, to investigate a reported error in the marking of a post in township 35, range 13, west of the third meridian. The necessary surveys were made to determine the true position of the post and the marking corrected. We then returned to Saskatoon and took the Canadian Northern railway for Prince Albert. There I hired a team and democrat to drive out to township 50, range 6, west of the third meridian where I was instructed to survey the outlines of fractional section 26 which joins the Sandy Lake Indian reserve. I ran the east and north boundaries of the section, the south boundary having been laid out years ago. Returning to Prince Albert I drove north through the woods to the correction line on the north boundary of township 50 in range 26 west of the second meridian to complete the survey of two lakes which had been traversed in township 51 but not in township 50. The road was terribly rough and not fit to drive over with any kind of conveyance except a strong wagon or cart. I managed to get through with no greater damage than breaking a few bolts and braces. Having finished this work and returned south I purposed surveying some islands in Redberry lake, and went to Borden, the nearest station on the Canadian Northern railway. On October 20, it rained and snowed all day and the storm continued the day following with high winds added to the other storm with no promise of early improvement, so I decided to go east and do some work less precarious until calm weather should return. I took the train to Howell station and procuring a livery rig drove out to township 41, range 27, west of the second meridian, to traverse a lake called by the settlers in the township 'lac Lizar.' While engaged on this work I was taken very ill which prevented me from going on to Basin lake as I had intended while in that part of the country. Changing from house to camp and vice versa after the weather becomes cold is very trying to one's health, and I felt it would be taking a great risk to continue so after I finished the traverse of lac Lizar on October 27. I returned to Saskatoon on the 28th, and on the 29th took the train to Duval where I stopped over to correct the position of a post on the north boundary of section 23 and to traverse a lake in section 9, township 25, range 22, west of the second meridian. From there I went to Lipton and procured a conveyance to take me to township 25, range 13, west of the second meridian to make a correction survey for which the land owners and settlers had petitioned the Department. For this work I hired two men to assist in clearing away the brush and digging the pits, completing the work on November 5, and on the 6th I started for home, reaching Niagara Falls on the 9th.

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If I had felt equal to the task I would gladly have remained in the West long enough to finish the work laid out in my instructions, but I did not deem it safe to remain longer.

I have the honour to be, sir,  
Your obedient servant,

THOS. FAWCETT, D.T.S.



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## APPENDIX No. 23.

## REPORT OF L. E. FONTAINE, D. L. S.

## INSPECTION OF CONTRACT SURVEYS IN NORTHERN ALBERTA.

LEVIS, QUE., February 15, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of the season's operations being the inspection of survey contracts Nos. 2, 16, 24, 29 and 31 of 1907, and Nos. 7 and 18 of 1908, all located in the Edmonton district, Alberta, made in accordance with your instructions of April 3, June 18, June 25 and July 9, 1909.

The usual preliminary preparations were made, after which I left for Calgary where I had to remain a few days, in order to attend to the forwarding by rail to Edmonton of horses, transport outfit and camp equipage left at De Winton at the close of the previous season's operations. On May 2, I arrived in Edmonton where I was to fully organize and equip the party for the coming season. This was attended to and everything put in readiness, but, owing to the wet weather, I had to postpone my departure till a few days later. As soon as more favourable conditions prevailed, I left for contract No. 29, proceeding first to Wetaskiwin thence via Falun and Battle lake to the end of the projected trail to Buck lake, now opened as far as the centre of township 46, range 3, west of the fifth meridian, and from here to my destination I resorted to and used pack horses.

During the time devoted to the inspection of this contract I may say that a very unfavourable state of things prevailed. We had more or less rain on twenty-eight days out of a total of forty-two; this proportion I believe would be found excessive if compared with the records of past seasons.

Furthermore, Modeste creek, which seems to be an insignificant little stream, was converted into a regular torrent; it flooded three different times, overflowed its banks and its rushing waters carried off most of the dams located on its course, which were used under ordinary conditions to regulate the flow of water for the driving of logs to Saskatchewan river. This was a serious drawback, for, in order to successfully carry on the operations, the creek had to be crossed at several places and this could not be done at high water notwithstanding repeated attempts to do so. At each attempt, the raft used for this purpose was hurled amongst the trees and brush on the opposite bank and no safe landing could be effected. These conditions greatly hampered operations, and I was forced to make a longer sojourn in this section than would have been necessary had conditions been normal, nevertheless with both patience and perseverance, the object in view was finally achieved. From there I left for Edmonton, arriving a few days ahead of the party and in the meantime giving my attention to the necessary organization for the projected inspection of contracts Nos. 2, 24, 16 and 31.

On July 17 I left Edmonton and proceeded with wagons by way of St. Ann to Chip lake. The trail followed is good as far as St. Ann and fair from there to the crossing of Pembina river. On the west side of the river it is a new trail opened by the Grand Trunk Pacific railway contractors so as to connect the numerous camps along the right of way and though it is not very good it is constantly being improved

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and ought soon to be in fair condition. From Chip lake the means of transport was by pack horse and the trail followed was the Jasper trail to 'Big eddy' on McLeod river where contract No. 31 is located.

The examination of this contract was proceeded with and the whole successfully accomplished in less than a fortnight.

My next operation consisted in the inspection of the remainder of contract No. 24.

In order to achieve this object I left 'Big eddy' on August 24, following Jacques trail easterly to the southeast quarter of section 15, township 54, range 16. At this point McLeod river was forded and the journey was continued by way of the Grand Trunk Pacific pack trail as far east as section 30, township 53, range 13.

The necessary inspection operations were carried on through several of the townships comprising this contract and progress recorded to the prevailing conditions.

In accordance with your instructions I then gave my attention to that part of contract No. 7, of 1908, situated on the east side of McLeod river. In order to reach this location I followed an old pack trail running parallel to the valley of Carrot creek and joining the Jasper trail in the vicinity of the fourteenth base line in range 13, and proceeded west from there by the Jasper trail to township 52, range 16.

The examination of this part of contract No. 7, of 1908, was duly made, and next in order was the re-inspection of part of contract No. 24, and the whole of No. 2, of 1907.

To reach these townships I journeyed eastward by the Jasper trail as far as Little Lobstick river and from there to Foley, Welch and Stuart's construction camp at the east end of Chip lake, I went by the Grand Trunk Pacific tote road; from the construction camp I followed the railway right of way a distance of about one and one-half miles and then travelled northerly by various settlers' trails till I reached Jacques trail on section 36, township 54, range 10.

A thorough re-inspection as called for by your instructions was made, and, when completed, attention was given to parts of contracts No. 16, of 1907, and No. 18, of 1908.

So as to successfully visit the greater number of townships embodied in these two contracts I went easterly by Jacques trail from section 36, township 54, range 10 to the meridian line on the east boundary of section 27 township 54 range 9, thence I went northerly following a pack trail opened by the subdivider and which led to the centre of township 56 range 9, and from here on proceeded as much as possible by the meridian lines to Green Court postoffice in township 58 of the above mentioned range on the trail leading from St. Ann to the mouth of McLeod river and thence northwesterly by this road to the McLeod flats. From this point I had no alternative but to double for a certain distance the route previously travelled; I therefore proceeded southeasterly by the McLeod trail as far as Selleck's in township 59, range 10 and from there south to township 56 of the same range, thence westerly across part of ranges 10 and 11 and north to the southeast corner of section 23 township 57 range 11 where I joined a wagon trail leading to Green Court and recently opened by Mr. G. P. Roy, D. L. S., who was then engaged in township subdivision in the vicinity; thence following the said trail easterly I proceeded to township 57, range 10.

Having been informed by Mr. Roy that this township was then ready for inspection, and although not included in my instructions for the present season, as I was on the premises, I thought I should not let pass such a favourable opportunity, and accordingly I carried on the required operations and on their conclusion continued my journey to Green Court.

On my arrival at this point owing to the unfavourable climatic conditions then prevailing and my transport outfit not being adequate to undertake extended travelling I decided that after performing the following miscellaneous surveys I would cease operations.

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1. The retracement of the two interior chords of township 57 range 7 west of the fifth meridian together with the traverse of Pembina river in section 1 of the same township.

2. The verification of the monuments at the northeast corner of section 32 and at the quarter section corner on the east boundary of section 10 both in township 56.

3. The traverse of Little island and Windy lakes in township 55, range 5.

On the completion of these operations I proceeded to Lake St. Ann settlement and from there to Edmonton where I arrived on December 20.

The following day the party was disbanded and the outfit stored as instructed.

Concluding, I must record my appreciation of the services of my assistant Mr. C. B. Allison; at all times he has performed his share of work with ability and good will.

## GENERAL DESCRIPTION.

The necessary field notes and detailed reports on the inspection of these several contracts have already been submitted, therefore, I will here add but a few brief notes respecting the main topographical features and general resources of the area covered during last season:—

## CONTRACT NO. 29 OF 1907.

In this contract an examination was made of township 47, range 4, and townships 48 and 49, range 5.

The surface of township 47 is generally so rolling and thickly wooded throughout, that at the present time it offers very little inducement to settlers.

In townships 48 and 49 the country has a gently rolling aspect and for the most part has been overrun by fire. In such places it is dotted here and there with open prairie spots and islets of second growth poplar. The soil in general consists of a layer of black loam of variable depth resting on a clay subsoil. This section is well watered throughout; besides Modeste creek there are numerous smaller streams having a permanent flow.

No extensive hay meadows were noted, but there is an abundance of good fodder, especially on the flats of Modeste creek where peavine, blue-joint and other luxuriant grasses for stock raising are to be found. These two townships, I believe, would be well adapted for mixed farming.

## CONTRACT NO. 31 OF 1907.

The general aspect of the surface of the six townships comprising this contract is slightly rolling. It is a succession of low ridges running parallel to the general direction of McLeod river. The devastating fires have not spared this section; part of it has been burnt, but what has escaped the fires is well timbered. In township 52, range 19, and adjoining McLeod river a good block of timber suitable for lumber was noted.

McLeod river meanders through townships 52, ranges 18, 19 and 20, and township 53, range 18. Its general direction in this vicinity is east, its width is on an average two hundred and seventy-five feet, with a current of two and one-half miles per hour. It flows in a valley having an average depth of one hundred feet, the banks sloping from two to thirty-five degrees. Its sinuous course forms intermittent flats of more or less extent and several of these have already found occupants. Except on the river flats the nature of the soil in general is sandy, but a good many sections suitable for mixed farming are scattered throughout this locality and owing to the proximity to proposed railways, intending settlers have already made entries.

The Grand Trunk Pacific railway company survey lines were intersected in townships 53, ranges 18, 19 and 20.

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Numerous hay sloughs of variable acreage are to be found interspersed among the surrounding ridges, and the hay crop gathered therefrom would be more than sufficient to supply double the present demand.

Traces of drift coal were noted at several places along the course of the McLeod but nowhere could any coal seams be located.

A store where one can procure all the necessities of life and a good many luxuries is located in section 3, township 53, range 18.

In McLeod river and its tributaries delicious brook trout, whitefish and pickerel can be had during the open season. Game, with the exception of bear, is scarce.

PART OF CONTRACTS NO. 24 OF 1907 AND NO. 7 OF 1908.

Owing to these contracts being contiguous, the main topographical features of the various townships allotted in each being almost identical, and to avoid repetition, the following general description will apply to both.

The surface of this section is rolling. It is a series of jackpine or poplar ridges with intervening depressions, wherein muskegs and swamps of more or less extent are to be found. Most of these swamps can be easily drained and by so doing the present available acreage for settlement in this vicinity increased, but I believe that the alternating flats along the course of the McLeod together with the good arable lands bordering Carrot creek and Wolf river will be found sufficient to meet the increasing demand for some time to come.

The soil in general consists of a light loam resting on a clay subsoil, and except for the valley of the rivers above mentioned, where it is of a better quality, the remainder may be called third class.

Fire has overrun this section in many places destroying the merchantable timber along the water courses. The parts thus visited are now covered with heavy windfall intermingled with a second growth of poplar, and owing to these conditions are next to impassable for man or beast.

The course of McLeod river, flowing in a north-northeasterly direction, crosses ranges 15, 16 and 17. The stream has an average width of three hundred feet and a current of two and one-half miles per hour. The valley is one hundred and twenty-five feet deep and the slopes to the river vary from two degrees to an abrupt cut bank.

The right of way of the Grand Trunk Pacific railway is intersected on the east boundary of sections 15 and 16, township 54, range 14, and also on the east boundary of section 3, township 54, range 16. On the east boundary of section 4, township 54, range 16, survey location lines in connection with the same railway were also noted.

The Grand Trunk Pacific railway tote road from Chip lake to the McLeod crosses the east boundary of section 29 and the north boundary of section 32, both in township 53, range 13.

RE-INSPECTION OF PART OF CONTRACT NO. 24 AND ALL OF NO. 2, BOTH OF 1907.

Owing to the special instructions regarding this particular section and presuming that a description of the territory has already been supplied when it was previously visited, I will not duplicate here the information already given.

PART OF CONTRACT NO. 16 OF 1907.

In this section the topography is of a varied nature; in township 57, range 9, township 58, and the south half of township 59, range 10, the surface is rolling, but the remainder of this locality, with the exception of the flats bordering the Athabaska, is broken and hilly.

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A range of hills, varying in height from one hundred and seventy-five to six hundred feet, and distant a mile from the shore line, follows almost the course of the Athabaska and McLeod rivers, and enchasms an extensive flat known throughout this district as the 'McLeod flats.'

The soil of this flat is exceptionally good, and as proof of its excellency I may add that several settlers had already located previous to the survey.

This section has been visited by fire, but here and there islets of poplar and spruce have been spared, while the remaining surface is covered with a second growth of poplar.

Athabaska river, which is one of the large streams of northern Alberta, flows easterly at a rate of five miles per hour, and winds in and out of townships 59, in ranges 10 and 12. It has an average width of eight hundred feet, and in many places its waters are diverted into a number of channels, thereby forming numerous islands and gravel bars.

McLeod river empties into the Athabaska on section 35, township 59, range 12. Its width here is five hundred feet and the surrounding hills are one hundred and seventy-five feet in altitude.

A coal seam twenty-five feet thick, one hundred feet long and ten feet above the water's edge in the bank of Athabaska river, one chain west of the east boundary of section 33, township 59, range 10, was noted.

## PART OF CONTRACT NO. 18 OF 1908.

The general aspect of most of the townships in this locality is rolling, with partly open spots alternating with clumps of poplar.

The soil in general consists of a layer of black loam with a clay subsoil, and for the most part may be rated second class.

This section is well watered. Besides Paddle river which winds in township 56 across ranges 9, 10 and 11, there are numerous small streams with an abundant flow.

Owing to the good arable lands and its close proximity to the Grand Trunk Pacific this section will no doubt be rapidly taken up by land seekers, for all indications tend to show that it is a favourable spot for mixed farming.

## TOWNSHIP 57, RANGE 10.

The surface of this township is rolling and covered for the most part with poplar and willow scrub.

A few islets of green timber suitable for building purposes have been spared, but the supply therefrom for such purposes will be limited.

In this township a permanent supply of good water is to be had. This coupled with the abundant fodder and the excellence of its soil in certain sections would make these particular spots most suitable for mixed farming.

I have the honour to be, sir,

Your obedient servant,

L. E. FONTAINE, D.L.S.

## APPENDIX No. 24.

## REPORT OF T. D. GREEN, D.L.S.

## SURVEY OF COAL LANDS IN WESTERN ALBERTA.

PRESCOTT, ONT., March 15, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report of my work during the season of 1908.

On June 15, I received your telegram to report to you for duty, and reached Ottawa on the 18th. My instructions dated June 15 were, in short, as follows:—To subdivide as far as practicable townships 40, 41 and 42, range 19, and township 42, range 20, west of the fifth meridian, for the particular purpose of locating certain coal lands.

On the 22nd I took the train for Edmonton, Alberta, where I arrived on Saturday, the 27th. On the following Monday I sent to Angus McDonnell, near the village of Ray, for the horses and outfit allotted to me. On enquiry about the route to the Brazeau district, I learned that the only practical summer route was from Banff or Laggan on the main line of the Canadian Pacific railway, and as it was necessary to hire a whole car to transport the horses from Edmonton to Laggan I concluded, that in order to save time and to be sure of securing trained pack ponies, to complete my transport and camp outfit in Edmonton and ship all to Laggan. This I did with as little delay as possible and reached Laggan on the afternoon of July 6th. Fortunately, Thomas Wilson, of Kootenay plains, on Saskatchewan river, arrived in Laggan on the 8th, having come over the route we were taking and gave us full information of the trail and fords, but advised us to wait two days, when he would return with us and show us the proper fords and trail, as the rivers were flooded and there was still considerable snow on the Pipestone summit. However, as our horses were soft, our packs heavy, and the feed around Laggan very poor, we decided to make a start and go by easy stages until Mr. Wilson overtook us. We reached the Kootenay plains on the 17th and crossed Saskatchewan river on the 18th by swimming the horses, and conveying the goods across the river in Mr. Wilson's canoe. All these streams were high and flooded, and being very rapid, were dangerous to those unacquainted with the exact location of the fords, especially those of Siffleur and White Goat rivers.

We reached Bighorn river on July 20, and Brazeau river near the northeast corner of section 36, township 44, range 19, west of the fifth meridian, on the 27th.

On the 29th I started a meridian line from the said section corner and ran south on the outline between ranges 18 and 19 and completed it to the southeast corner of section 1, township 43, of said range, on August 14.

The country in the immediate vicinity of the foregoing line is rough, hilly and mountainous, interspersed with numerous muskegs and brooks along which latter one is compelled to travel, although frequently driven to the tops of the high banks on account of the gorges and muskegs. The timber is generally small spruce, balsam and poplar.

On August 17 we again reached Brazeau river, about a mile south of the northeast corner of section 36, township 44, range 20. A canvas canoe allotted to me having

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been appropriated by another surveyor, I was left without one, and now, owing to the recent heavy rains, I found Brazeau river a torrent. We immediately began to build a raft and having completed it began to transport the party across the river, but found the raft too heavy and unmanageable in the very swift current, and after several narrow escapes from accidents, we were compelled to abandon it and to build another.

On August 25, we began the meridian outline between ranges 19 and 20 of the said township and completed it to the southeast corner of section 1, township 43, on September 12. We did not run the 'jog' at the end of this line because we were short of provisions. This meridian line crosses the northwest extremity of the Bighorn mountains, and the country in the immediate vicinity is rough and mountainous, with numerous muskegs and small streams of good water. There are no trails and one is compelled to cut out pack trails to move the outfit. There is some good timber along Brazeau river.

The general description of the country along and between the two lines is broken, hilly and mountainous, thickly covered with small spruce, balsam and poplar, interspersed with numerous muskegs and streams of good water. The grass is luxuriant in places but is not generally abundant. Fire has devastated the whole country and one frequently encounters vast sections of windfall and *brulé*. It seems a pity that some means can not be devised for removing the dead and fallen timber as, should another fire start, this fallen timber will be excellent kindling to ensure its spreading.

We were told that there was an old trail going southeast from near the south end of our last line by which we could quickly reach the south branch of Brazeau river, but we could not find it and were compelled to return by the same route by which we entered.

On Monday, September 14, while journeying southward towards the eleventh base line, the main camp met Messrs. Round and Anderson returning from Laggan with a supply of provisions. As nothing had been seen or heard of D. L. S. Saunders, and his operations on the said eleventh base line, and as we were conveniently near the 'jog' on the eleventh correction line between ranges 18 and 19, I decided to run said 'jog' which we completed on the 18th. We moved to the south branch of Brazeau river on the 19th, and camped in the immediate vicinity of the coal lands located on said stream. Learning that the eleventh base line was not yet sufficiently run westward for me to use, I made a traverse survey of the location posts of the coal lands here and completed the same on the 24th. This traverse would have to be made some time, and as it was convenient to do it now, we did it so as to allow us more time for the subdivision work when we came north with our work from the eleventh base line. On the 25th we moved camp southward on the Brazeau trail to a point near 'The Grave,' near which point we estimated the base line would cross.

We spent the next three days trying to locate D. L. S. Saunders, who was surveying the base line, but could not find any signs of his party or of their operations. After satisfying myself that the base line had not been surveyed westward over and across the bald and rugged range of the Bighorn mountains, I decided on account of the lateness of the season that it was not advisable for me to wait any longer. I learned afterwards that the survey of the said base line did not reach range 19 (where I was to begin operations) until the end of November, which means that it would have been necessary for me to wait more than two months before doing any more work. On September 29, after having left notices of my action for Mr. Saunders, I abandoned further operations and started southward for Morley, where I stored my camp equipment and arranged for the wintering of the horses in accordance with a previous communication to you.

I have the honour to be, sir,  
Your obedient servant,

T. D. GREEN, D.L.S.



## APPENDIX NO. 25.

## REPORT OF A. H. HAWKINS, D.L.S.

## SURVEYS OF PARTS OF THE TWELFTH AND THIRTEENTH BASE LINES WEST OF THE FIFTH MERIDIAN.

LISTOWEL, January 14, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of my field operations under instructions from your Department for the production of the thirteenth base line from range 17 to the sixth meridian, and the twelfth base line from the fifth meridian, west to range 20.

I left home for Edmonton May 9, 1907, reaching my destination on the 14th, and upon enquiry found that I was too early to attempt to take the field with a pack train as the season was very backward, and consequently the grass upon which we had to depend for horse feed had not sufficient growth. I did not, therefore, leave Edmonton until June 7, taking the larger portion of the outfit in wagons, in order to have the pack train in as good condition as possible when called upon. The wagons were paid off at the west end of Island lake, as the roads were in very bad condition, practically impassable any farther. We reached the Pembina crossing on June 17, and found the river very high, so that we had early use for the King canvas boat supplied by the department. We followed the Yellowhead Pass trail from this point, finding it very bad indeed; in many places being merely a streak of mud through the forest rather than a horse trail, and constant showers did not improve its condition. Progress was accordingly very slow, as we were forced to relay over the worst portions, and unpacking a pulling horses from mud-holes was an hourly occurrence.

On June 26, somewhere about range 14, west of the fifth meridian, according to information I had received, we found a trail which was said to lead to the southwest, and probably near the thirteenth base line. Here we nailed up a mail box on the main trail, left our letters and started into the country west of Lobstick river, off the trail, which was practically unknown. Some packers who had been over the trail, pretended to give information, but it was always couched in such general and ambiguous terms, that the writer found many interpretations might be put upon it.

The trail which we were following, however, led to two large creeks, evidently tributaries of the Pembina, and at that time full to the top banks with recent rains.

We were by this time ten or twelve miles south of the base line, but our trail was heading to the southeast, instead of the southwest, as I had been informed, so that upon crossing these large creeks, I determined to cut our own trail, and travel in the direction we wished to go.

On July 4, I sent my packer back to get supplies from 'Big eddy,' the location of which we did not know, except that it was on the Jasper trail and to the west; and with the balance of the party, I kept pushing my way towards the base line. Two men were sent to explore for the line from the large creeks, and found we were opposite range 14, and they estimated that we were fourteen or fifteen miles to the north, and that the intervening country was a horrible muskeg; however we pushed along as fast as possible, as now we had to not only cut trail, but find a place



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where a trail could be cut, as the continued heavy rain was converting the country into a vast bog, and the daily rains did not add anything to the comfort of life. Our packer returned with provisions on July 23, but had been forced to leave a horse en route. With this supply I hoped to reach the starting point on our line, and possibly find some better country through which to run a trail to the north, as my packer informed me that it would be impossible to bring in supplies over this trail again. By the time we had reached section 32, township 48, range 17 west of the fifth meridian the efficiency of my pack train was alarmingly reduced, as our supplies were low, three of our horses had died from hoof rot, which seemed to be caused by the constant travelling through mud, several others were afflicted and could take no loads, and to add to our troubles the feed was very scanty and poor. I had explored the country ahead as far as possible, but there seemed to be no change in its character; apparently it was not a country for trails. I had therefore to make a start at once for the Jasper trail, as only some five days provisions remained, and after cutting horse trail for two days, and penetrating some seven or eight miles north, we found it impossible to take the pack train further. I therefore gave orders to abandon everything but axes, a canvas pack cover, and the balance of our provisions, and strike for 'Big eddy' or the trail. We reached 'Big eddy' on August 12, and here we had at least provisions, but unfortunately the packer who was to move our supplies had started a few days before for the mountains, and I had to await his return to move my outfit. However, as we did not know anything of the trails, or if there were any leading to the south from 'Big eddy.' I questioned all comers who were likely to know, and ascertained that there was supposed to be a trail on the east side of Embarras river said to lead to the south. I therefore cut a trail on the south side of McLeod river at 'Big eddy,' and pushed it southward until we met the trail leading up the Embarras; by the time that this was completed the packers had returned, and were ready to move our provisions. Although I had been assured the packers knew the country, they both were certain they knew nothing about it, and could not speak English. Just here I should like to warn surveyors, who have not had the experience, that half-breeds and Indians will almost invariably claim to be unable to speak English, although knowing it fairly well, thus frequently giving a surveyor much trouble. This same packer, a half-breed, came to me on my return this fall, addressed me in excellent English, asking how I got along, &c.; the lesson is obvious. However I was not to be put off, as my outfit was on the thirteenth base line, and myself and party on the fourteenth. After four days travelling, a portion of which was over a very good trail, he found English enough to inform me, he thought we were twenty-four miles south, but I insisted upon another day's travel, before accepting the delivery of the goods, and on August 30, I took over the supplies, and we were again on our own resources, but as I had no instrument with which to ascertain the latitude, we could only guess as to our position. Next day, however, we started in to find our abandoned camp and horses, and after five or six hours of travelling through muskegs we came across the trail which had been made in going to 'Big eddy' some two weeks before; and reached the camp in the afternoon.

The following day one man returned for the balance of the party whom I had left camped at the cache, which, by the way, was still some four or five miles north of the base line; the rest of us started in to round up our pack ponies, and soon had them together, with the exception of two, one of which had died, but the other had strayed off and could not be found.

We succeeded in getting a fairly good pack trail from the cache to the end of our line, and on September 5 had pushed ahead so that we were then able to start cutting on our line, having occupied almost three months in getting to the work and making a trail over which we could get in sufficient supplies. Everybody was much relieved and we hoped with what supplies we had to reach our cache on McLeod river. But just then, through a violent snow storm, we lost four days, which made us decidedly

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uncomfortable, as four to six inches of wet snow is, in the woods, probably the most disagreeable experience one can have. However, as soon as the snow ceased falling our line was continued with few interruptions about twenty miles to range 21. The three men whom I had sent out a week previous to find McLeod river and locate our cache returned, with the information that they had found the river and had followed it for twenty miles north without finding the cache. There appeared nothing to do but to follow this river, as I knew it would lead to 'Big eddy,' whether it were the McLeod or a branch of the Embarras, and by this time my supplies were getting very near the vanishing point. We had, therefore, to leave our line again and reached 'Big eddy' on October 14, just one week from the line, and having to cut trail most of the way.

The country over ranges 18, 19, 20 and 21, so far as I could ascertain, is a series of low jackpine ridges, generally covered with heavy windfall, and largely composed of a clay and quicksand soil, so that after three or four horses had passed over it became an impassible mud-hole, necessitating a new trail. Between these ridges were muskegs, generally supporting a stunted growth of spruce and tamarack, through which we had to corduroy the worst portions to make our trail passable. I had expected that on reaching any streams the water would naturally draw off and leave us on more solid ground, but except a very narrow strip along the banks muskeg prevailed everywhere. Small meadows were found along the east and west forks of the easterly branch of Embarras river, but in the vicinity of the base line these were of small extent, although farther to the north there are some very excellent meadows producing a good quality of grass. One in particular about four or five miles south of the mouth of the Embarras was observed; it would be from three to four miles in length and a mile wide. About the centre of this meadow the Embarras divides into two large streams, and in the vicinity of this fork the land appears to be fairly good on both sides of the river, and would be well adapted for a horse or cattle range, but so far as I could ascertain the extent is not large, and probably would be all included in two or three thousand acres.

In range 20, we came upon a large tract of open country evidently recently burnt over, supporting in places an excellent growth of grass in the valleys, the ridges however being chiefly covered with a thick growth of small jackpine and willow. Many traces of deer and moose were noticed in this locality, and I have no doubt when access is practicable, it will make an excellent grazing range. The whole of range 20, probably two to four miles north of the base line, and four to six south of it would take in this open area.

At 'Big eddy,' I was fortunate in finding some supplies that had been ordered when last here, and after arranging our affairs, we left for our cache on the McLeod, which we reached on October 19. As I had my instruments along on this occasion, I ascertained the latitude of the cache to be  $53^{\circ} 23'$ , or some twelve miles too far north. Evidently the freighter had ignored the positive instructions given by Mr. Saint Cyr to place the goods six miles south of the junction of the west fork and McLeod river, and had placed them six miles north, which to us was a very serious matter, as this portion of the trail is very rough and little travelled, and from the base line meant a trip of from three to five days, depending upon the condition of the river, as the trail crosses it some eighteen or twenty times in this distance.

After renewing our supplies from the cache, which was only in fair condition, we continued our journey to a camp ground on 'Big prairie,' where I ascertained the latitude to be  $53^{\circ} 11'$ . Here I left my camp while I explored ahead for a trail to reach our line, about fifteen or eighteen miles eastward. Fortunately at this point the McLeod takes a sharp bend to the east, and I followed the river trail about twelve miles farther up the stream, and climbed the high hills on the north side. As these are wholly or partially denuded of timber I was able to recognize the hills where our line had been abandoned, and could distinguish the cache that had been placed on the

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hillside and covered with a white tarpaulin. It required three days to locate and open a trail to a camp in the Embarras valley, from which we could reach the end of our line, and on October 29, we began to produce the line westward. This was continued until November 18, at which time we had reached the west boundary of range 23 and winter was apparently on.

The country through range 21 is a series of high rolling hills, evidently the advance guard of the mountains, cut by the west fork of Embarras river, which is crossed by the base line within a few miles of its source. A rather fair piece of country though small in extent was crossed in this basin of the Embarras on the west side of range 21, but it does not exceed one thousand acres. From the west side of the Embarras valley to the McLeod, the line passes through some very fair spruce timber, with a scattered growth of jackpine; trees eighteen to twenty-four inches in diameter were frequently met with, but the country is cut by many muskegs, in which are formed small creeks running into McLeod river.

I had ordered no oats, as so many vexations and tedious delays had not been anticipated. The grass had been frozen and killed for over a month, and for working horses without oats, was very poor food, so that on November 19, I started on my return trip to Edmonton, and as we had to relay, the party did not reach that place until December 20; the writer, however, arrived some days earlier and found your instructions to proceed with the twelfth base line, to begin at the fifth meridian. After a few days spent in arranging for further supplies, and some rearrangements in the party, I left for Lacombe and Ponoka on December 28, left Ponoka with the party on January 1, 1908, and on January 4, began retracing this line. In contrast to our experience on the thirteenth base, we never lost a day until heavy snowstorms in April kept us back slightly. The three first ranges of the twelfth base were almost without obstacles in the matter of trails, as settlers' roads could be used as far west as the Buck lake trail in range 3. After this, so far as the trails were concerned, we were on our own resources again, but my packer was an exceptionally good man, and with the additional assistance allowed by the Department, I found it necessary only on two or three occasions to put the full force to cutting trail, so that our line was steadily pushed forward until we reached range 17.

The retracement of the base line ended at the east boundary of range 9, where in accordance with your instructions, correction was made for the amount of accumulated error, across the eight ranges retraced, in section 31 of range 8. Some difficulty attended the crossing of the Saskatchewan valley, as the banks are steep and precipitous in this locality, but once on the western bank, the surface is gently rolling, and largely muskeg with low ridges covered with small jackpine and windfall, which condition prevailed until we reached Little Brazeau river.

Some very fair timber was noticed between the Saskatchewan and Little Brazeau along sections 33, 32 and 31, range 9, and apparently extended some distance south.

The land along the Saskatchewan is very rough and broken, the bottom lands being covered with a heavy growth of spruce timber, while along the banks a large amount of dry timber and windfall is to be seen.

Along the Little Brazeau were noticed several fine meadows, one lying just north of the line, about eighty or one hundred acres in extent, to which could be added sufficient to make a very good range by cutting the brush on the upland, as the soil is apparently fertile, and in this locality extended from three-quarters to one mile on either side of the river, but in many places the muskeg extends right to the high water mark.

Between the Little Brazeau and Brazeau proper, the country is largely muskeg, and low ridges covered usually with jackpine although a few poplar bluffs were noticed, but they were usually small. Dry timber and windfall prevailed all along, and on the Brazeau was very thick, which rendered trail cutting difficult, but once on the

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main Brazeau, which we struck in section 36, township 44, range 13, the question of trail was solved for, so long as we used sleighs we kept our trail on the river, and were thus able to push rapidly ahead.

The river bottom affords considerable feed, in the shape of goose grass, but the larger meadows, of which several were noticed, were so badly littered with windfall, as to make them almost useless, without clearing. In section 32, township 44, range 15, the line again crosses the river, and several rather open meadows were noticed, which would probably produce good grass in the late summer and fall, but numerous indications of inundation were observed all along, which would rather deteriorate from their value. The land between these crossings is very rough and rolling, cut by many ravines and creeks, leading to the river, and is largely covered by windfall and dry timber.

Some drift coal was noticed along the valley, but no coal in place was observed.

On March 27, my packer informed me that it was necessary to move our camp and outfit as far as possible up the river next day, and for him to leave with the teams at once, as otherwise they would not get out, as the river was beginning to break very fast. We therefore moved to section 35, township 44, range 16, about six miles ahead of the line, and from this position we produced the line into range 17.

From section 35, range 16 to section 34, range 17 rather a fair tract of country was crossed, extending to the river, and south to the foothills, which could be cleared and cultivated with little trouble.

Upon completion of the line to range 17, we lost four days, as my pack train had not yet arrived, and the line had been produced about six miles beyond camp; fortunately, however, two prospectors with a band of pack ponies came along just at this time, and I thought it better to engage these men to move us ahead, than to wait for our own horses. Arrangements to this end were made but as their horses were small, not very well fed, and numbered but eleven, the camp and stores had to be moved in relays; however by careful arrangement we were able to keep the line moving.

Ranges 17, 18 and 19 lie in the foothills, which are rather rugged, cut by many deep ravines leading to the Brazeau, and covered with burnt timber, much of which was standing, and a second growth of jackpine and willow. The line passed through a nice bunch of pine and spruce timber, from the crossing of the Brazeau in section 35 to section 32, range 19, extending from one-quarter to three-quarters of a mile north, and over a mile to the south, apparently across the river and well up the hills on the south side. The country in the foothills, although rugged, would I think, if cleared, form admirable cattle ranges, as many places could be easily improved which would support a good growth of grass, while abundance of good water is always available.

We finished the twelfth base line on May 14, and next day started to cut our trail to McLeod river. The old trail had evidently fallen into disuse, and was very difficult to follow in places, but here our good fortune followed as we met a gentleman looking over the Brazeau coal lands, who had come from the McLeod, under the direction of an efficient guide. As they were very lightly loaded, they travelled through muskegs and over fallen timber which was quite impossible for us to attempt without first clearing the way, but on May 25, we reached an old camp ground on the McLeod, and next day found our cache, that had been sent out during the winter, in the place designated. We were now in a position to successfully attack the thirteenth base again. The line between the main branch of McLeod river and the west fork runs through a rather rough and broken country, not at all adapted for agriculture, although in the valley of the McLeod there are several very excellent hay meadows, one lying to the south of the base line being exceptionally well thought of. With the exception of one or two short breaks, this meadow, locally called the 'Big prairie', extends up the river a distance of ten to twelve miles, and would make a most admirable cattle or horse ranch, as there is ample timber for shelter or buildings, and a large amount of excellent pasture, a considerable portion of which could be readily cut for

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hay, and in the most favoured portions I have no doubt potatoes and oats could be successfully raised. After leaving McLeod river, the land is poor and great difficulty was experienced in finding grass for our horses. Things became worse, as we approached the mountains, so much so, that during the latter part of June, and early part of July we had to feed oats, a supply of which I had sent in during the winter to my McLeod river cache.

As we approached the mountains the country became much more rugged, cut by numerous deep ravines, and high rocky hills, chiefly wooded, although many covered with windfall having been burnt over, were in sight. The green timber was chiefly spruce, while that burnt over was pine, the spruce however seemed to have resisted the fires that have apparently swept this country.

The northeast corner of township 48, range 26, falls on the summit of the Folding mountains, and from this point to the centre of range 27, we were in the mountains proper, and in order to produce the line across range 26, we were forced to abandon our horses, and move camp on our backs. Some of the party demurred at this unaccustomed method of transportation, but when the chief showed them how it was done by a practical example, they all followed suit, and in this way we succeeded at last in producing our line to the summit of Fiddle Creek range, one of the most rugged and precipitous in this rugged locality.

Chaining was found to be practically impossible across Drystone and Fiddle creek valleys, and had to be accomplished by following the ridges around from one peak to another. From one of these ridges one could throw a stone into the valley of either the Drystone, Fiddle creek, or McLeod, all of which are timbered with stunted spruce and jackpine, with a large amount of windfall. The summit of Folding range at the time of my visit was covered with several varieties of beautiful wild flowers, forget-me-nots, white heather, and a very fine moss flower, besides several other varieties, which in a measure rewarded one for the rather arduous climb to reach them. This summit appeared to be composed of a disintegrated granite, with large boulders of limestone in many places, while the summit of Fiddle Creek range was limestone, the peaks however being capped with sandstone, chiefly broken up in large cubical chunks or flat slate-like pieces, all very difficult to climb and wearing out shoe leather with alarming rapidity.

After establishing a station on the summit of Fiddle Creek range, we returned to our main camp in the valley of a branch of the west fork of the McLeod, where we had left our horses, and my packer had, with the assistance of some Indians, who fortunately came along, found and opened an old trail north and west to the Jasper trail, striking it some fourteen miles northwest from Fiddle creek, and thus taking us around the impassable Folding and Fiddle Creek ranges. We followed the Jasper trail to where Fiddle creek leaves it, and thence up Fiddle creek trail to a point from which we could reach our station on the summit of the range. From this camp ground it was simply a matter of climbing and working one's way around the bare cliffs. The several branches of Fiddle creek were truly a fearsome sight, as in many places the gorge was cut through solid rock, that towers six or eight hundred feet above the bed, which is composed of boulders of all shapes and sizes, intermixed with logs as though hurled together by some Titanic hand into a most incomprehensible jumble. The climbing was so arduous and so wearing on shoe leather, that none of the party had the courage or ambition to go to the hot springs, said to be on the south or main branch of this creek, as by this time it had become necessary to devise all sorts of means to prolong the life of boots and shoes.

Once over the mountains chaining was again resumed, and the line quickly produced to Athabaska river, and here our canvas boat was again called into use, and as the water was very high and the current strong and treacherous, it was only by the greatest care we succeeded in getting safely across and producing the line to its intersection with the sixth meridian. While here however I had the good fortune to

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meet Mr. A. Saint Cyr, D.L.S., who was producing the sixth meridian over the mountains from the north.

The tie line northward to connect with the fourteenth base line was run without much difficulty, as our horses had ample feed in the valley of the Athabaska, and although the timber was thick and hard to clear in places, the worst portion of the line was behind us. Coming from the McLeod valley to the valley of the Athabaska was like getting into a new country. The grass was very fine and luxuriant in the open places, in fact vegetation of all kinds had a more flourishing appearance. The meadows were a mass of orange lilies and roses, and although flies and mosquitoes were more numerous and savage, every one seemed to enjoy the change.

#### WATER-POWERS.

Water-powers might be developed in many places along both the twelfth and thirteenth base lines by means of dams, as the current is invariably rapid and the banks in many places well adapted for power development. The best places were on the main Brazeau and Fiddle creek. On the main Brazeau through township 44, ranges 17, 18 and 19, the main bed of the river lies through canyons the sides being almost perpendicular in places, and the power that might be developed practically unlimited, as the river is said to have its source in the everlasting snows and glaciers that cap the mountains surrounding its head waters.

Fiddle creek is if anything better adapted for the development of power, although the volume of water is much less than that of the Brazeau, but its course through the mountains is so hemmed in by rocks that in places damming to any height would be comparatively an easy performance, and would have the additional advantage of being close to the main line of the proposed Grand Trunk Pacific railway. This stream is fed by numerous springs, among them being several hot springs on its main branch, some seven or eight miles up stream from the crossing of the thirteenth base line.

#### TIMBER.

First class timber was very scarce along these two lines although the whole country is classed as timbered, but fire which at various times has swept over the whole country, has destroyed thousands of acres of what apparently has been very fine timber. Many places on both lines were covered with windfall piled at times eight to ten feet above the ground, with trees whose diameter would run from two to three feet, indicating a soil adapted to a good vigorous growth. In townships 48, ranges 20 and 21, where the line passes through an open country, the timber has apparently been burnt off, as logs and standing stumps, thirty to thirty-six inches in diameter were frequently noticed. On the thirteenth a fringe of timber was noticed along the east branch of the Embarras, through range 18 and part of 19, but it appeared to extend a very short distance on either side of the line. Through ranges 22, 23, 24 and 25 more or less timber that was fairly good was passed, trees in places being sixteen to twenty-two inches in diameter, but muskegs seem to spread all over this country and in places extend right to the river banks.

Along the Athabaska and on the west side of it the line ran through the finest timber that was seen, but the area was small, just a fringe along the river.

The line connecting the thirteenth and fourteenth base lines, ran through a very fair bunch of timber bounded approximately by Drystone creek to the south, Jasper trail to the east, and Athabaska river and Brulé lake to the west and north. The timber is chiefly spruce, six to twenty-four inches in diameter, but rather short and very limby. A few specimen of Douglas fir and a few small pine were also noticed. This timber on the Athabaska will be easily logged, as the Athabaska is a river that would probably not be difficult to drive, and three to five miles would be the longest haul required, while Brulé lake is in an admirable position for holding logs. The timber along the McLeod and between the west fork and McLeod river will, I



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think, be comparatively easy to put into the water, and the river with small improvements easy to drive.

On the twelfth base line a small amount of good timber was noticed in the valley of Saskatchewan river, and several patches of second class timber before Little Brazeau was reached. From this to the main Brazeau was chiefly muskeg and the timber, except in the valleys, was of little value, and with the exception of a few scattered large trees immediately along the river no timber was seen until we came to range 19, which extends from sections 35 to 32, is rather thick, and would run from six to twenty-four inches in diameter, but the extreme difficulty of driving the Brazeau on account of the rapid current and numerous channels and bars make the value of this timber rather problematic.

As to the future of the country governed by these two lines, there are places where mixed farming might be successfully carried on, with special attention to cattle or horses, once roads are opened and easier and more speedy means of transportation provided.

At the intersection of the twelfth base line with Little Brazeau river, and at the first and second crossings of this base line with the Brazeau, are tracts that could be easily cleared, and would doubtless provide a good living. Along ranges 17, 18 and part of 19 on the twelfth base, the country has been repeatedly and badly burnt, but with cultivation, I am satisfied good hay and probably oats could be raised. If cleared of the windfall, many places in these foothills, ranges 17, 18 and 19 would be ideal ranges for cattle, as also are some of the river flats along the Brazeau.

On the trail leading from the Brazeau to the McLeod a very nice meadow was passed along the north fork of the Brazeau, indicating that good meadows might be found along this river. About the headwaters of the Pembina and McLeod are numerous meadows well watered and yielding abundant grass, and would probably with improvements make excellent ranges, but the elevation would lead one to expect summer frosts, that would prevent farming to any great extent.

On the thirteenth base line there are some excellent meadows along Embarras river, the eastern branch of which is crossed by the line in section 32, range 18. To the south the valley appears to be very narrow and rough, but to the north are several fine tracts of meadow land both on this and the western fork. These two branches meet about eight miles south of the fourteenth base line, and join the McLeod about section 1, township 52, range 19. At the junction of the two branches of the Embarras is a very fine meadow some three miles long and extending from one-half to one and one-half miles on either side, and will doubtless at no very distant date be occupied by some enterprising rancher, as the grass and peavine are excellent, and the supply of water, of course, unlimited, while there is sufficient timber for building and fuel close at hand. In winter this place would be easily reached by following the McLeod from 'Big eddy' to the mouth of the Embarras and thence up that river on the ice. In summer the trail cut by the writer on the south side of the McLeod from 'Big eddy' leads through it.

At the intersection of the thirteenth base line and McLeod river lies another very excellent meadow, known locally as 'Big prairie.' The meadow land extends, with but two small breaks from eight to ten miles up stream, and is in the writer's view an ideal ranch for horses or cattle. The valley is from one-third to three-quarters of a mile wide, and in many places hay could be cut without preliminary clearing. Oats, potatoes, and garden produce could be grown here without trouble, as the country has but a slightly greater elevation than 'Big eddy,' where Messrs. Brethoux and Sinclair have most excellent gardens, with small improvements.

Some few small meadows were noticed on the west fork of the McLeod, but all of small extent; the soil is very gravelly and the grass is short and poor compared with that of the main McLeod.

The valley of the Athabaska was the next point that attracted our attention, and presented possibilities for farming, and, after our sojourn in the mountains and higher

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altitudes along the line, was like a different country, although where our line crossed at the head of Mud lake, an overflow of the Athabaska, it did not appear inviting, but both north and south of this point the country is more interesting. To the north along the Jasper trail are many beautiful meadows, supporting a most luxuriant growth of grass and peavine and I am informed horses can winter here and do well. This locality will without doubt at no distant date be one of the beauty spots on the Grand Trunk Pacific railway as the valley is walled by the rugged precipitous bluffs of the Folding and Bullrush mountains, which present most gorgeous colourings, both at sunrise and sunset. It is watered by Drystone and Prairie creeks. The open meadows during the summer are a mass of flowers, and backed by the darker green of the coniferous forest surrounding it, makes a picture not easily forgotten.

If the writer might be allowed he would suggest that the limits of the Jasper Park forest reserve be extended, say to follow the correction line between the thirteenth and fourteenth base lines, to range 17, and thence southeasterly to cross Brazeau river about range 13 and thence to the correction line between the eleventh and twelfth bases and possibly farther, but that is as far as the writer's observations go. The country embraced is not well adapted to farming of any kind and would take in the head waters of the McLeod and Pembina rivers, which have their source in the foothills, being fed by springs and muskegs and thus prevent their deterioration through lumbering operations. If a few main trails were maintained, the game and fish protected, and a careful system of burning of windfall, and reforestation in the more favoured localities through this tract, a few years of careful and judicious management would, I am sure, show that an asset of inestimable value had been started in Canada. The species of wild animals badly need protection, such as moose, elk, caribou, mountain sheep, and red deer as well as partridge and ptarmigan, whose seasons of grace are not respected by native hunters. These are being rapidly thinned and will, I am convinced, in a few years be nothing to us but memories and names, unless some such preserve is established in the near future. During the time that I was on the west fork of the McLeod, a band of native hunters were at the headwaters of this stream, which is said to be a favourite grazing ground for mountain sheep. Prospectors and others I met in this locality have told of the finding of bodies of these animals shot and allowed to lie, apparently merely to satisfy a lust for blood. If such reserves were made it would not be difficult to prevent illegitimate hunting, as once the Indians and halfbreeds knew such a reservation had been made, and poaching would be punished, there would be little trouble, as they have a healthy and wholesome fear of authority. It, therefore, seems to the writer that with three such worthy objects as preservation of the watersheds of the McLeod and Pembina, reforestation of tracts not fitted for agriculture, and preservation of the game in a tract so eminently suitable for such purpose and when other countries are being rapidly taken up, something surely might be done in the fairest land of them all, to preserve such a portion in its primeval state as would be commensurate with the dignity and future requirements of Canada.

In conclusion, I would like to express my appreciation of the devotion to duty of my assistants, Mr. E. W. Murray, and my head chainman, Mr. R. K. Wickham, as I consider the success of the expedition, such as it was, due in a large measure to these gentlemen. My chainers, I think, established a record, as a four and five chain tape were used in chaining the two hundred miles of line through as rough a country as is generally encountered, without breaking either of them.

Some of the accompanying photographs may be of interest enough to publish, but I regret to say that several of my best exposures taken in the Folding and Fiddle Creek ranges were destroyed by the pony submerging himself and his pack while crossing the creek.

I have the honour to be, sir,  
Your obedient servane,

A. H. HAWKINS, D.L.S.



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## APPENDIX No. 26.

## REPORT OF H. S. HOLCROFT, D.L.S.

SURVEYS IN THE PEACE RIVER DISTRICT, 1908.

TORONTO, February 17, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on my operations in the field in Peace River district during the period between February and December, 1908.

In furtherance of your instructions dated December 23, 1907, January 11, 1908, January 30, 1908, and subsequent instructions, I left Toronto on February 23, 1908, and proceeded to Edmonton where I organized a party of thirteen, including myself. Labourers were not scarce, but men of the better class were not very plentiful, and one had to exercise one's discretion in choosing men who are to be out for a protracted period. I left Edmonton on March 12 for Peace River Crossing, via the usual route, *i.e.*, to Athabaska Landing by trail, from there by ice via the Athabaska and Lesser Slave rivers, and Lesser Slave lake to the Lesser Slave Lake settlement at the west end of the lake, thence across the portage to Peace River Crossing where I arrived on March 30. The distance from Edmonton to Peace River Crossing is about three hundred and eighty miles.

Lesser Slave river was open in many places, and the ice for about fifteen miles was covered with water from six inches to one foot deep, and this again with a thin sheet of ice. This ice cut the horses badly and made progress very slow.

I had the greater part of my supplies freighted up as far as Peace River Crossing earlier in the winter of 1908.

When I left Edmonton there was little or no snow on the ground, so I used wagons. Two days out from Edmonton as the snow became deeper, I changed from wagons to sleighs.

My transport now consisted of six horses, two wagons and two sleighs. In Edmonton I had a large rack made for one of the sleighs, and also had fixed up attachments so that I could use four horses. This I found very convenient, as it was not then necessary to double up going up steep hills and through bad places.

Hay was procurable at most of the stopping houses on the way up, but oats could be obtained only at Athabaska Landing, Lesser Slave lake and some at Peace River Crossing.

Directly on my arrival at Peace River Crossing I proceeded up Peace river about thirty miles to run the twenty-first base line across ranges 24, 25 and 26. This had to be done before I could do any of the subdivision work I was instructed to do. The point where I had to start from being back some seven or eight miles from Peace river and up on a hill amongst dense timber; we had to pack our camp outfit and supplies on our backs as there was no feed near for the horses. I completed this fifteen miles of the twenty-first base and then started to subdivide townships 81, ranges 25 and 26 according to my instructions.

In the district in which my work lay, *i.e.*, townships 81 to 84 inclusive, ranges 23 to 26, all west of the fifth meridian, Peace river flows through a valley about three

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and one-half or four miles wide. The southeast or right bank is densely wooded down to the junction of Peace and Smoky rivers. The right bank is eight hundred feet high and the slope to the river breaks off quite abruptly at a distance of about one and one-quarter miles back from the river. Farther back the country is nearly level and heavily wooded.

The northeast or left bank contains the better country for farming or ranching. On this side of the river the top of the hill is not reached for a greater distance back than on the right bank, some places as far back as four miles. Near the river there are a few small flats containing a few acres each of level land. Then the hills begin and the country is rough and broken until the top of the hills is reached. This country between the top and bottom of the hill is good only for grazing purposes, being too rough for farming. The plateau is gently rolling and about semi open, and has good soil consisting of a top soil of black loam from two to twelve inches in depth and a clay subsoil. Fuel in the form of poplar, balm of Gilead, willow and some spruce and tamarack is abundant. Water is rather scarce in some parts, but there are several small lakes and an occasional small slough. Bear lake, Old Wiyes lake and Burnt river furnish water. In some of the more swampy portions there is also water. There is no reason to believe that water could not be procured by digging wells. Upland hay and peavine can be cut in many places in townships 82 and 83, ranges 24, 25 and 26, and there is lots of meadow hay and slough grass near Burnt river and around Bear lake. The whole country on the top of the hill on the left bank of Peace river from Dunvegan down to Peace River Crossing, and also I believe, in 'Whitemud prairie' is excellent ranching country. I can see no reason why it would not be a good farming country and raise good wheat, oats, barley, &c. There is enough moisture and the soil is good. During the year 1908 the climate was remarkably mild and equable; no frosts occurred that did any damage. Vegetables of all varieties grow luxuriantly, and indigenous vegetation was remarkably profuse. Mr. Thos. Griffin, living in section 33, township 81, range 25, sowed a few acres of wheat, and also of oats, which this year produced very good results, the grain being large, full and hard. Mr. Griffin also had a large vegetable garden that produced excellent potatoes, cabbage, radishes, beet-root, turnips, carrots, lettuce, onions, &c.

The season of 1908 was very dry. This did considerable damage to the crops in the valley of Peace river, but what crops were planted on the top of the hill were a success.

No minerals of value were discovered, though the clay of the country should make good bricks. Some float coal was discovered on the beaches and bars of Peace river.

After I had finished the subdivision of townships 81 ranges 25 and 26, I proceeded on June 20 to lay out an addition to Shaftsbury settlement. In 1906 Mr. H. W. Selby, D.L.S., laid out about eight miles of river front, starting in section 1, township 82, range 24, and proceeding northeasterly down the river. I commenced where Mr. Selby left off and proceeded to survey out settlement lots from there down to directly opposite Peace River Crossing a distance of about eight miles. I also laid out as lot No. 43 an island in Peace river, which is near the shore, and at low water is connected with the mainland.

This new portion of Shaftsbury settlement contains some good level land lying in benches along the river front. In some places it is stony and gravelly, and in some places the hills come right to the edge of the river so that some of the lots are of very little value for farming purposes. I laid out twenty-three lots. I made the direction of the lot lines and the rear lines conform as nearly as possible to the direction of the river. I laid the road allowance out as nearly as possible to conform with the present travelled trail, and to pass also where improvements had been made. I also laid out the lots in such a manner as to give every squatter the improvements he had made. Road allowances running from the main road in the settlement to the rear of the settlement were also laid out at suitable intervals.

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Although the water in Peace river rises during the spring floods to a height of fifteen to twenty feet none of the lands are liable to be flooded to any extent.

As I had instructions to survey township 81, range 24, I next started upon this work. I swam my horses across Peace river, and as this township was densely wooded I used a pack train. I hired three pack horses to supplement my transport service, and borrowed some pack saddles from the non-commissioned officer in charge of the R. N. W. M. P. at Peace River Crossing.

I finished the subdivision of this township on October 24, and then ran the east outline of townships 82, ranges 24 and 25. I next commenced to subdivide township 82, range 24. On November 30 the river became filled up with ice and froze over finally on December 1. I waited until I had completed the subdivision of township 82, range 24, and on December 16, started for Edmonton using sleighs. I left my two wagons at Peace River Crossing.

The last two weeks of the work in the mounding was very difficult. Frost was in the ground to a depth of fifteen inches or more and the pits required a lot of labour. The days too, at this time of the year, and in this latitude ( $56^{\circ}00'$  north latitude) are so short that economical work cannot be done.

The ferry set up this year at Peace River Crossing by the government of the province of Alberta, furnishes a much needed facility for crossing Peace river. Before the ferry was put in one had to cross in canoes or if horses had to go over a barge had to be rowed over which entailed a great deal of trouble and considerable expense as the current of the river is swift here.

Peace river is a fine large river flowing swiftly, but has no rapids or falls to impede navigation between Fort Vermilion and Fort St. John.

In high water the Hudson's Bay Company's shallow draught, flat-bottomed steamboat 'Peace River' goes as high up this river as Hudson's Hope, a considerable distance above Fort St. John.

Anyone going up with horses during the winter of 1908-09 would have to carry oats from Lesser Slave lake westward. At Peace River Crossing the crop of oats was practically destroyed this year by the drought, and oats, if any can be procured at all, will cost about \$2.50 a bushel at Peace River Crossing.

One of the great needs of this country is railway communication. At present and for a few years yet ranching or stock-raising can be profitably carried on, but for farming purposes a railway is required, even if it only comes to the south side of Peace river.

The Roman Catholic mission in Shaftsbury settlement have a stone flour mill where wheat and other grains can be ground into flour or feed. They also have a saw and shingle mill, where one can buy finished material or have their raw material cut.

I arrived in Edmonton on December 29, where I paid off the party and stored the remainder of the outfit and arranged to have my horses wintered. I left Edmonton on January 7, and arrived in Toronto January 12, 1909.

I have the honour to be, sir,

Your obedient servant,

H. S. HOLCROFT, D.L.S.

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## APPENDIX No. 27.

## REPORT OF ERNEST W. HUBBELL, D.L.S.

## INSPECTION OF SURVEY CONTRACTS IN THE PROVINCES OF MANITOBA AND SASKATCHEWAN.

OTTAWA, February 20, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of my field operations on the inspection of survey contracts in the northern part of Manitoba and in Saskatchewan for the season of 1908.

In accordance with your general instructions dated April 7 I left headquarters as soon as I had collected the necessary data and paraphernalia requisite for a sojourn of eight months or more in the field. Arriving at Prince Albert (my organizing station) on April 20, I found a portion of my survey party encamped, as pre-arranged. It was fortunate that this had been done, as the breaking up of the ice in South Saskatchewan river would have prevented our crossing for several days; as my survey outfit and horses were in winter quarters on the south side of the river, we would have been detained some time awaiting the outfit of the ferry, which is still in use at this place, a constant reminder of the primitive methods employed in crossing rivers in the early days when steel bridges were an unknown quantity.

For the next few days we were engaged in overhauling and collecting transport outfit, engaging men, ordering supplies, making repairs, &c. By the 24th the river was clear of ice, and the following day (Saturday) the ferry was in operation across the river. As one of my horses had died during the winter and another a few days after we had them in camp, it was necessary to replace them by purchasing another team: This I did after considerable difficulty, as the right stamp of horse was hard to purchase at a reasonable figure, and good horses in the spring of the year are high priced, averaging from three to five hundred dollars per team.

It may be somewhat of a surprise to many who knew Prince Albert a few years ago to learn of the vast improvements that are being made almost daily in this city; for a city it is now, with a population of over 7,000. There are many beautiful buildings, including post-office and land-office combined, jail, city hall, convents, schools, banks, also some handsome stores and up-to-date hotels.

The city itself is most picturesque, situated in north latitude  $53^{\circ} 10'$ , longitude  $106^{\circ}$ , and 1,398 feet above sea-level, on the banks of Saskatchewan river, surrounded by hills covered with timber of various kinds. There are several mills, lumbering being the chief enterprise. The Canadian Northern Railway company has about completed a magnificent steel combined railway and general traffic bridge across the river immediately in front of the city in connection with the extension of their line to Battleford. This when finished will be of incalculable value to the residents in the surrounding district. Property in Prince Albert has more than quadrupled in value in the past few years and new stores, mills and private residences are constantly under construction. A very small percentage of the land within a forty mile radius of the city is under cultivation, the greater portion doubtless being under the control of speculators. This, of course, is a detriment to the natural advantages and possibilities of this fertile belt. Owing to the almost inexhaustible resources of tim-

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ber, minerals and game to the north, it does not require much perspicacity to prophesy an extensive and prosperous community in this vicinity which for many years has been lying dormant. To the east, west and south, is an ideal mixed farming district, where grain and vegetables of all varieties are raised in great abundance. The soil is excellent and suitable for the production of all varieties of grain and vegetables. There is a continuous and excellent supply of fresh water everywhere, and the climate is delightful. Who is there that can even faintly estimate the wonderful resources of this almost unknown country to the north, when it is a well known fact that wheat for the past seven consecutive years has been successfully raised at Stanley Mission, one hundred and fifty miles north of Prince Albert?

On April 27, we pulled out of Prince Albert, crossed the river on the ferry, and proceeded east-northeasterly along the Candle lake trail for forty miles, in the direction of my first work, which was the inspection of contract No. 13 of 1907, comprising townships 50 and 51, ranges 19, 20 and 21, west of the second meridian.

We experienced great difficulty in taking our outfit into this country, having to cut and brush miles of trails, build numerous bridges, corduroy mud-holes and use six horses to almost empty wagons. In addition, the incessant attack of flies allowed no rest to man or beast, night or day. There was a snowstorm two days previous to our departure from Prince Albert, which if possible, rendered the trails worse. As a great portion of this section of the country over which we passed is covered with large muskegs, it was most trying on the horses, especially so as there was no grass for them at that time of the year. We completed the inspection of this work on May 30.

The townships comprising this contract are all heavily wooded with poplar, some spruce, and jackpine, a fair portion being suitable for manufacturing purposes. There are numerous sloughs and muskegs, with sand ridges intervening, covered with jackpine. The soil is principally sand, a great portion is unfit for agricultural purposes. Whitefox river, a stream varying in width from two to three chains and from three to six feet deep (according to the season of the year), flowing easterly across townships 51, ranges 19, 20 and 21, proved an impediment to our progress, as we had to cross it at different places, necessitating the building of several bridges. There are no settlers or inhabitants in this section of the country, but game of all varieties is most plentiful, especially moose and elk.

Being unable to retrace our steps over the route we came by, on account of the frost being out of the muskegs, we had no choice but to cross the Saskatchewan river at Fort à la Corne, where we arrived on June 2, and experienced unusual difficulty in taking our outfit across the river, as the only means available was a small sheet-iron boat. I may say that this was a rather precarious operation, but the great danger lay in swimming our horses, as the current is swift, the river is wide and the shore on the south side of the river quicksand. It was with thankful hearts we saw the last man across in safety. From here we proceeded towards Prince Albert, passing through a beautiful fertile country, presenting so marked a contrast to that just passed over that it was hard to realize that the only difference lay in being on the south side of the Saskatchewan river. For the first time our horses were able to obtain a plentiful supply of good grass.

On the 5th we crossed the South Saskatchewan river at Merkley's ferry, and arrived at Prince Albert the following day, passing on our way several cattle that had been killed by black flies.

Again recrossing Saskatchewan river we followed the Sturgeon lake trail and on June 10 arrived at township 52, range 1, west of the third meridian, a portion of contract No. 20 of 1907, that had not been inspected.

We again experienced the usual difficulty in gaining access to our work, on account of bad trails, having often to cut out and make our own. Townships 52, ranges 1 and 2, west of the third meridian, are thickly covered with spruce, poplar, hazel and willow, a fair portion being suitable for manufacturing purposes, although

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the greater part has been cut, as these townships form part of a timber limit. We came across several vacated lumber camps. In this part of the country there are many muskegs and sloughs; the soil is generally sandy loam and well adapted for agricultural purposes. There appeared to be no settlers in this vicinity. Whilst at work here, the sand flies, bulldogs and mosquitoes were almost unbearable, neither man nor beast being able to obtain a night's rest. Upon the completion of the inspection of this work, we again moved camp to Prince Albert, arriving there on June 17. Owing to the very high water in the river (caused by the usual freshet from the mountains) and thousands of sawlogs which had broken loose from a boom at Edmonton, the ferry was unable to cross; consequently we were delayed two days and a half.

The trails still continuing to remain unusually wet, I endeavoured to move my outfit by rail from Prince Albert to Tisdale, but was unsuccessful, owing to the irregularity of the train service, caused by inundation of the track in various places.

On June 20 we crossed the Saskatchewan and, on the 22nd, the south branch on our way to Tisdale, distant about one hundred miles, arriving there on the 27th after a week's travelling made arduous by trails well nigh impassable. The portion of country passed over might be called the garden of the Prince Albert district, being well settled, with large areas under cultivation. The soil is excellent, the surface fairly level and about half covered with poplar and willow, with plenty of good water. The harvest yield is exceptionally plentiful, the settlers apparently prosperous and content.

From Tisdale we proceeded southerly to inspect townships 42 and 43, range 12, west of the second meridian, a portion of contract No. 7 of 1907.

Owing to almost continuous rain there was no improvement in the trails, in fact they were so bad that I was perforce obliged to hire additional transport, my own horses showing symptoms of collapse. In order to gain access to these townships, we were compelled to pack a portion of the outfit on our backs, across an immense muskeg extending for miles.

These townships are practically all covered with timber and muskegs and it is most difficult to carry on the work of inspection. So shaky and wet was the ground that it was next to impossible to set up an instrument with any degree of solidity, although long hubs were constantly used. We were in water three-fourths of the time—in fact slept in it. There is a fair quantity of merchantable timber in these townships, principally poplar; there are also a number of quarter sections suitable for homesteading—in fact several are already taken and, doubtless, when trails are passable many more will be entered for, as the soil is of good quality. Red Deer river flows through township 42, range 12, and is the water route for logs from the lumber camps to various sawmills along the Canadian Northern railway.

On July 8 we again arrived at Tisdale and, as authorized, engaged a box car to finish the inspection of contract No. 7, which extends along both sides of the Canadian Northern railway for a distance of one hundred and thirty miles and well into the province of Manitoba.

This portion of the country inspected is about sixty per cent muskeg, and at the time of inspection (July) was nearly under water, which in many places covered the railway track to such an extent as to almost demoralize freight traffic; wrecks were of frequent occurrence and the transport of freight for a time was suspended. The soil, generally speaking, is unfit for agricultural purposes. There are but few trails and no settlement away from the railway stations. All the country embraced in this contract is practically covered with heavy timber, consisting of spruce, poplar, tamarack, birch, elm and thick underbrush of willow, alder, cherry and hazel. A considerable portion of the timber is suitable for manufacturing purposes and at nearly every railway station there is a sawmill, with output varying from 300,000 to 800,000 feet a day. The most important mill is at Barrows, on Red Deer lake, to which a branch railway is constructed and operated. Whilst engaged upon this work the heat was excessive, 96° in the shade not being uncommon. For about a month we lived in the box car, shunted



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and moved from time to time as was most expedient or suitable to the railway officials, who on the whole treated us fairly well, although at times our car was placed between cars loaded with huge piles of lumber (a violation of the Railway Act), or again between open flat cars loaded with logs or ties, truly not an enviable position, when the condition of the track is considered. However, it was the only method that could be adopted to carry on the survey successfully, as it was out of the question to move horses across the muskegs.

I may add that fully sixty-five per cent of the country along the railway from Tisdale to Woody river, one hundred and sixty miles, is totally unfit for agricultural purposes. I think the contractor, Mr. McFarlane, deserves credit for successfully conducting his survey under many adverse circumstances through this district. Upon the completion of the inspection of this contract on July 28, we were moved by train from Novia, the eastern terminus of the contract, forty-three miles to Swan river, and from here I sent two men to Tisdale to bring by train my horses, which had been in pasture during the inspection of the contract.

Not having been in Swan River for about eight years, I was agreeably surprised at the progress the town had made since my last visit, and especially at the number of substantial and pretty residences that had been erected.

The Canadian Northern Railway company has built a branch line from Swan River southwesterly and had under operation about thirty miles, the terminus being a small but thriving town called Benito. From there they were constructing the line westerly and expected to complete about forty miles before the winter. This line will open up a new section of the country and be of great advantage to the numerous settlers now flocking into this fertile district.

On August 6, I commenced the inspection of contract No. 11 of 1907 and completed this work on the 13th.

The greater portion of the country passed over on our trip from Swan river to this contract, about eighty-five miles, is covered with timber, poplar predominating. The soil is sandy loam, suitable for the production of wheat, oats and vegetables. It is not as yet thickly settled, but, having many advantages, there is no doubt that it will be, in the near future.

The country comprising contract No. 11, townships 37 and 38, ranges 1, 2 and 3, west of the second meridian, is generally hilly and covered with fair-sized poplar, spruce and tamarack. Adjoining both sides of Swan river, a stream about one hundred and ten links wide and from two to six feet deep, which flows through this contract, are numerous sloughs and muskegs, which, although fairly dry at the time of inspection (August), are no doubt quite wet during the rainy months.

From here we had to cut many miles of trails in order to inspect the remaining contracts, which were scattered over a large area of this portion of Saskatchewan; our progress was therefore necessarily slow.

On August 15, we commenced the inspection of that portion of contract No. 6 of 1907 comprising townships 37, ranges 5 and 6, and townships 38, ranges 4, 5 and 6, west of the second meridian, and completed the same on the 20th.

The country comprising this portion of contract No. 6 is comparatively hilly, and mostly covered with poplar, tamarack, willow and some spruce, with numerous sloughs and muskegs intervening. There are also a few large lakes, several creeks and some open spaces.

There is but one trail that passes through this portion of the contract, the only settlers being a few Galicians. There is a small mill situated in the southeast quarter of section 10, township 38, range 5. The soil is generally sandy loam with a little gravel here and there.

The Etoimami lakes are situated in townships 37 and 38, range 5, and, as their Indian name implies, are situated on the height of land. It is from these lakes that the north and south Etoimami rivers, which flow in opposite directions, have their source.

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Whilst encamped here we were visited by a large band of Saulteux Indians who were on a moose hunt. They were painted in all the colours of the rainbow and were most picturesque,—a formidable outfit, as each man was armed with a rifle of improved pattern. I presume a considerable slaughter of game took place. This was not the only occasion that came under my notice of Indians killing game out of season, which, if persisted in, will soon exterminate all the larger game in the country.

From here I proceeded to Kelvington postoffice, where we received a month's mail, and from there to Little Nut lake, where I received a telegram notifying me of the death of Mr. Edgar Bray, D.L.S., and requesting me to return to his contract, complete the inspection and look after the disposal of his party. This I accordingly did, driving to Wadena, fifty-five miles, for the purpose, where I took the train to Kam-sack, from which place I travelled by trail to Fort Pelly, twenty-two miles. After completing the inspection of the late Mr. Bray's contract and reporting fully thereon to the Department, I returned to my survey camp,

I then completed the inspection of contract No. 6, comprising townships 38, ranges 10 and 11. The work done in these two townships, as in the other portion of this contract, was particularly well done.

We next inspected a portion of contract No. 27 of 1907, consisting of townships 39 and 40, range 11, and township 40, range 10, west of the second meridian. This section of the country is mostly covered with small poplar, willow and some spruce, with a few small areas of prairie. The soil is excellent, the surface generally level and well watered by lakes and creeks. The largest lake is Little Nut lake, which is about three miles in diameter.

Red Deer river, a stream of considerable importance, about three chains in width and four to eight feet deep, used for floating sawlogs to the mills, flows across these townships. This country is admirably adapted for farming. As usual, we had difficulty in taking our outfit through this district, there being no trails of value to us.

We next proceeded to townships 42 and 43, ranges 9, 10 and 11, west of the second meridian, the remaining portion of contracts Nos. 27 and 28 of 1907.

Commencing work on September 10, we completed the inspection on September 23.

As usual, we had to cut miles of trail in order to gain access to these townships, which are nearly all covered with poplar, willow and some scattered clumps of spruce. There are also numerous small lakes and muskegs. The surface on the whole may be classed as undulating, the soil sandy loam suitable for the production of all kinds of grain and vegetables.

There are no settlers in this district, nor are there any trails.

The work of the contractors in these townships was of a superior order.

In the course of our manoeuvres we several times crossed Red Deer river, a small stream previously referred to.

On September 26, we moved camp eighteen miles, along an old trail to Crooked River, a small village on the Canadian Northern railway whose chief enterprise is lumbering, and which possesses a sawmill employing about fifty men.

From here we proceeded to Tisdale, twenty-two miles, following a bush trail that would be impassable in the summer months. The country passed over is all thickly timbered and there is no settlement.

Remaining in camp at Tisdale one day to repair our dilapidated outfit and complete some final returns, we next proceeded to township 42, range 16, and finished the inspection of the remaining portion of contract No. 28 on October 9. The country passed over is an ideal farming district, about sixty per cent covered with timber. There are numerous settlers throughout this district, which is well supplied with good water, graded trails, and soil of fair quality.

The work of the contractor, Mr. Cautley, in the townships comprising this portion of contract No. 28 was by far the best work examined during the entire season,



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and too much credit cannot be given for the great care shown by him in the opening, cleaning and draining of lines. Our next work was the mounding of the east boundary of townships 39 and 40, range 17, and verifying the marking of a witness mound at the northeast corner of township 39, range 16. This corner is on a small island in a large lake, and in order to get there we had to construct a raft. On October 13, we started for Prince Albert, where we arrived October 22. On this trip we passed over a great portion of country previously described, and on account of several heavy rains were unable to travel continuously. From Prince Albert we again crossed Saskatchewan river and moved our outfit into township 52, range 3, west of the third meridian (contract No. 11 of 1908) and commenced inspection on October 27, finishing the same on November 4.

Townships 52, ranges 3 and 4, were the only townships finished in this contract. They are almost covered with timber, principally poplar with considerable spruce, of which a good portion is suitable for manufacturing and other purposes. These townships are included in a timber reserve granted to the Prince Albert lumber company. There are no settlers, and but one trail runs across the northern part of the townships to Stump lake, where a large sawmill is in operation.

Until the timber is cleared from this district there is very little chance of settlement.

There are several lakes in this vicinity which teem with fish. Whilst at work here we traversed several lakes, some of which it would be next to impossible to traverse in the summer.

On November 5, we started for township 47, range 11, west of the third meridian (contract No. 21 of 1907), where we arrived November 12. Owing to rain and snow the trails were soft and sticky.

We finished the inspection of this contract on November 21, a detailed report of which was forwarded you. From here we moved camp to Prince Albert, arriving there on December 2. During the course of our inspection, extending over a period of eight months, we travelled by trail many hundreds of miles, covering a large area, principally wooded, in the northern portion of the province of Saskatchewan.

## CLIMATE.

Speaking generally, the weather conditions were unfavourable for surveying operations, as during the season we had fifty rainy days; for days at a time we failed to see the sun, and atmospheric conditions were against observations on Polaris. We therefore had to resort in many instances to sun observations. On April 21, the ice was out of Saskatchewan river, which was again frozen over on November 21. The snow was practically gone by April 24, and its first appearance of any account was the first week in November. The greatest quantity of rain fell during the month of June (fifteen days). We had slight frost every month except July. The hottest day was July 25, the thermometer registering 96° in the shade. The coldest day was December 1, 40° below zero. The first snow fell on September 23, and on November 16 the snow was ten inches deep and the ice twelve inches thick. Sloughs were frozen over on October 28.

In my many experiences in surveying I have never seen the number of mosquitoes, black flies, bull dogs and 'no-see-ems' equalled; they commenced May 5 and smudges were necessary until September 23. When moving camp the horses were kept blanketed and quantities of fly oil used.

On May 9, we were invaded by a swarm of flying ants of unusual size, measuring fully three-fourths of an inch in length. After settling down they proceeded to divest themselves of their wings.

When taken into consideration that horses are our only means of transport, it will readily be admitted that they should be of the best, particularly so on inspection work, as in that case the driving is more continuous and distances much farther

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than in ordinary survey work, and now that contracts are chiefly in wooded country, and likely to remain so, transportation through such country is doubly hard and most trying on horses, more especially in the spring of the year when trails are almost impassable, little or no fodder obtainable, and the horses generally in poor condition. Swamp fever, a prevalent epidemic in various parts of the west, is most disastrous, as many horses die from it and others sick with it are useless to the surveyor for most of the season.

During my peregrinations I passed through several Doukhobor villages and was agreeably surprised to find such good progress made, particularly in the cultivation of land. Several informed me that they had ceased to acknowledge Peter Veregin as their leader, and were working on their own responsibility.

We did not perceive any indications of minerals or coal, although it was reported that a rich vein of gold was discovered at Lac la Plonge, one hundred and fifty miles north of Prince Albert.

Great quantities of game, both large and small, abound throughout this district.

In conclusion, permit me to place on record my appreciation of the valuable services rendered by my two assistants, Messrs. W. G. McGeorge, of Chatham, Ontario, and Sydney D. Fawcett, of Ottawa. Both these gentlemen vied with each other in the performance of their duties, which they accomplished in a satisfactory manner.

The innovation of appointing two assistants to each inspector proved most satisfactory, as it enabled the inspector to forward to head office without delay the final returns of inspection, thus allowing the office staff to compare and check the contractor's notes and returns, effecting an early settlement.

I have the honour to be, sir,

Your obedient servant,

E. W. HUBBELL, D.L.S.

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## APPENDIX No. 28.

## REPORT OF ALFRED W. JOHNSON, D.L.S.

SURVEYS IN THE WESTERN PORTION OF THE RAILWAY BELT, BRITISH COLUMBIA.

KAMLOOPS, January 22, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on my season's work in 1908.

I left Kamloops on February 13 and began work at Hope. There were some corrections to be made in the survey of the townsite and I ran one or two lines over what is called Little mountain, besides making some connections between the old lots west of Hope and the Dominion system surveys.

Two weeks later we moved up to Yale by canoe, a feat I would not attempt again with loaded canoes unless there was absolutely no other way of getting up. The river is full of rapids that are dangerous for any one but seasoned Indians to pole up and it was more by good luck than anything else that we got to Yale without casualties.

We were at Yale for six weeks making a resurvey of the suburban lots west of the town and of the crown-granted lots between that place and Choate. The original notes of the suburban lots were destroyed in the New Westminster fire, and though there are some copies of various old plans extant they do not agree very well.

There are, however, one or two corners of fences about the position of which there is no reasonable doubt, and I had the invaluable assistance of Mr. McKenzie, Dominion lands agent at New Westminster, so that the resulting survey is probably as near the original as it is possible to get it now.

It would be well if every owner of a piece of land would first of all take the trouble to find out where his corners are when he comes into possession and, secondly, mark such corners by something not easily effaceable. People have no idea at all how difficult it is to re-establish corners. Many consider that you are wasting the Government money if you go any distance from the desired corner to pick up some known point to work from.

These suburban lots are on a hill facing south and, though stony, grow very good fruit. Mr. Wm. Teague has russet apples that I think would be hard to beat anywhere and the Yale cherries are proverbial in British Columbia. There is a lot of this side-hill land between the town and Hope, and where it has been cleared excellent fruit is grown. But clearing is so very tedious and expensive that one hesitates to advise people with no capital to go on to a bush place. For men with a steady income in search of a beautiful country and a mild climate this part of the Fraser valley offers great attractions.

In the middle of April we took to the water again and ran the rapids at a higher stage of water than when we came up. There is some compensation about canoeing when you are going down stream, even in a gale of wind, and we got well settled in camp at Ruby Creek the same day.

There were a couple of new lines to run here but they unfortunately led over a totally inaccessible precipice so the work took longer than would appear necessary.

Mr. C. D. Brown, as first assistant, and Mr. C. A. Morris, as second, had joined me at Yale. It is a very great help to have a man with you who can take charge of a

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transit. There are often times when you can have two parties out at the same time, each consisting of three or four men, and in this way more work can be done.

Two weeks later we canoed to Rosedale, landed and having hidden the canoes in the bush above high water line, moved by wagon to Rosedale, where we camped in a swamp.

There are some new settlers on the hills under Elk falls and I ran some section lines for them. These foothills rise to a height of nearly a thousand feet above the Chilliwak plain, and taken as a whole are not quite as difficult to clear as the average coast land. The soil is good for fruit and no irrigation is necessary. They are not more than five miles from the Fraser at Rosedale landing, and I think that much activity will be shown in this place.

The weather was distinctly wet even for this district while we were there, and we were in a swamp to begin with and were practically camping in a lake when we left.

The middle of May saw us on board the canoes again en route for Harrison river, where I ran some new lines between the river and the mountains and traversed a small lake where a new settler has begun a clearing.

This part has been logged and there are one or two good skid roads that would be of much use to intending settlers. The great drawback at present is that Harrison river is the only means of communication with the Canadian Pacific railway.

I left my canoes here and went to Keefers to do mountain work. In traversing up the Similkameen trail in 1906 I found a discrepancy in the position of the posts on the railway belt limit in the Canyon trail according to this traverse. My instructions were to find where this discrepancy was. I, therefore, determined to work across the mountains from Keefers to Spius creek to see whether the limit was correct at that point. I laid off a base at Keefers and sent two men on ahead over the mountains to put in stations on prominent peaks. Before doing this we ran some section lines below Keefers in the Nahatlatch river valley. My pack train had wintered at Keefers and it was necessary to swim them across to the east bank of the Fraser, and we did this one memorable afternoon. A canoe led the way with two horses in tow and we drove the others in after them. The river was in flood and running like a mill-race, the horses were no sooner in the water than they passed out of our sphere of influence, down stream. They got half way over without much difficulty, except that one of the led ones passed completely under the canoe and nearly upset it. At midstream, for some unknown reason, one of the horses in the middle of the line turned around and swam back. All those behind him followed suit and in ones and twos, strung out for a mile below where they went in, they struggled out. The rest of the afternoon was a nightmare of finding horses in all sorts of inaccessible places, roping them to the canoe and taking them over one or two at a time. One of them, an outlaw called Satain, fought like a fiend. Time after time we drove him into the river and as often he fought his way back dragging the canoe with him. At last they were all safely across and pastured on the Indian reserve.

We made an attempt to follow the triangulation with the pack train, but after climbing to a camp 5,000 feet above the river and finding all routes closed by six feet of snow, we abandoned the idea and I sent the pack train with most of the men around by the Boston Bar trail. Then I got two or three horses to take provisions and outfit for myself and one Indian, two days climb up another mountain and after that he and I packed across the mountains by man pack.

We had bad weather. For nearly a week the clouds refused to lift and for two days we sat huddled up under a signal tripod with no sleep and nothing much to eat, while a snow storm lasted, but on the twelfth day we pulled into the horse camp on Spius creek. When after some days delay, on account of clouds, we got our final angles on the railway belt limit, I found that at that place it was correct. If therefore, there was a mistake on the belt, it must be between Spius creek and the Similkameen trail. So I left half my horses and men with Mr. Brown, with instructions to run the belt

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limit section line by section line, chaining carefully and taking numerous observations for azimuth, southwards until he met me again.

I myself went down to Hope, laid off a base in the townsite and triangulated over the mountains, with stations on both sides of the Similkameen trail, to the Canyon trail, as a check on my traverse in 1906. These mountains are high and very steep, but fortunately I had a man in the party who could be trusted to read the less important angles and I gave him a transit and the southwest side to work up while I took the northeast. There were, therefore three parties using instruments at this time. After the usual misadventures of mountain work such as packing water 1,500 feet to a signal and draining rain off our blankets for tea and so on, I tied on to four separate section corners on the railway belt limit by triangulation and found that my traverse was correct, whereupon I checked the actual lines of the limit going north. Mr. Brown and I met on the south fork of the Tulameen and neither of us had found any error that would account for the one we were looking for. Therefore, I regret to say that though there is a mistake somewhere I cannot find it in my own work.

While the pack trains, carrying among other things a man who had cut his leg with an axe, were working back to Hope down the Canyon and Similkameen trails I took one Indian and went up to Coutlee to check a line that I thought, as a last chance, might be wrong. I found it correct and by dint of walking forty-seven miles, most of it during the night, got into Spence Bridge next morning.

I reported this result to you at the time and went on with other work, sending the pack train up to Kamloops for the winter. We ran a few lines near Suicide creek at Dewdney and then moved to Abbotsford. This was all resurvey and I was fortunate in obtaining good evidence for re-establishing the corners. This is a long settled district and there are many roads nearly all of which follow the section lines. A certain distance was taken on each side of the line for the road, and corners are in the middle of the roads.

In re-establishing these I sank iron posts in small piles of stones completely underground, in some places putting bearing trees too. I do not know of any other really safe way of marking such corners. I also re-established some corners along the international boundary and was very lucky in getting old bearing trees that nobody had been able to find.

From Abbotsford we went to the edge of the Pitt meadows near Port Hammond. There was a discrepancy in different systems of survey and I carried my lines in from the Canadian Pacific traverse surveys on the railway to make sure of them.

The summer and fall up to the end of September were very fine indeed. There was practically no rain from July 1 to the end of September. It was natural therefore that at Hammond and more particularly at Agassiz we should have a lot of rain. At the latter place it was very heavy indeed and we did a good deal of work in water up to our knees. Agassiz is a very fine farming country and the land is valuable. It was on that account more difficult than in most other places, even to get people to agree about their corners. However, in the instances where there was much dispute I managed to get papers from the adjoining land holders to say that they were satisfied.

On November 19, we went up to Lytton and after doing a small piece of work on the buttresses of Bothanie mountain, moved south of the town to lots 7 and 8, group 1. These I resurveyed after going very carefully over them with the old notes. Besides running three miles of section lines and traversing the east bank of the Fraser I tied on to the adjoining Indian reserves and reposed all corners I came across.

On December 17, I paid off the party and went up to Kamloops.

I have the honour to be, sir,  
Your obedient servant,

ALFRED W. JOHNSON, D.L.S.

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## APPENDIX No. 29.

## REPORT OF G. J. LONERGAN, D.L.S.

SURVEYS AND INSPECTION OF CONTRACT SURVEYS IN THE EDMONTON DISTRICT.

BUCKINGHAM, QUE., February 22, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report of my surveys and inspection of surveys in the Edmonton district during the past season.

Acting on your instructions dated March 19, I left home for Edmonton on the 28th arriving there on April 4. As my assistants were not to arrive until the end of the month, I engaged a few men and started to re-post the southerly two-thirds of township 51, range 26, west of the fourth meridian. Although this township is only twenty miles from Edmonton there are practically no improvements. In the north part of it the soil is good but to the south and centre it is either marshes, lakes or rolling sand hills. The lakes and marshes are principally held in place by old beaver dams, where if a couple of hundred dollars were spent, to loosen up the dams, a few thousand acres of good land would be available and would either produce an abundant supply of good hay or be fit for agriculture.

As soon as the grass was long enough so that there was sufficient feed for horses, I started to inspect Mr. M. W. Hopkins' contract, after doing which I returned to Saddle Lake settlement and received your instructions to go to Goodfish to make a traverse of part of Goodfish lake and to settle a difficulty as to the boundary of part of the Indian reserve and Government land. I requested Mr. Batty, the Indian agent, to help in this matter. We called a meeting of the chief and his councillors, and after an explanation of what the difficulty was and a walk over the ground, an agreement was arrived at and the necessary papers signed. I then put in permanent boundaries and when it was completed returned to Fort Saskatchewan, where I re-posted townships 54 and 55, ranges 20 and 21. Having completed this work I moved to Stratheona, where I loaded the outfit on a train and went to Stettler, then drove to the Hand hills and inspected Mr. Lewis Bolton's contract. The Canadian Pacific railway accommodation was so poor that I drove back to Edmonton almost as cheaply as if I had travelled by train.

I purchased supplies at Edmonton and started on another trip, via Athabaska Landing, lac la Biche, Goodfish, Saddle lake, Pakan and Edmonton, inspecting the contracts of Messrs. R. H. Knight, L. R. Ord, J. L. Cote, W. H. Waddell and H. McGrandle. Returning to Edmonton I reduced the party and drove to old Fort Assiniboia, inspected Mr. Fairchild's contract and traversed a few small lakes. As this completed the season's work, I placed my horses for the winter months with Mr. Angus McDonell of Ray, whose past work is worthy of praise. He gives the best of satisfaction, turning the horses over in good working condition. I then took a couple of men and an assistant and went by train to Vegreville and Vermilion, where I made a traverse of four lakes. When this was completed I returned to Edmonton and made preparations to come east.

I would like to call the attention of prospective settlers to a tract of good land extending from Athabaska Landing about twenty miles south, both east and west of

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the trail along the river, east even as far as lac la Biche. The country was at one time an immense spruce forest but repeated fires have reduced it to a light scrub. The soil is a few inches of black loam and a clay subsoil and there is an abundant supply of good water. At present a railway is about seventy-five miles distant but there is no doubt that before five years there will be a railroad through the district. Athabaska Landing is a good market and will be until a railway comes. Oats are worth seventy-five cents, and potatoes a dollar and a half, &c. The only reason I can see why this land was not taken up long ago is that the trail to the Landing passes through a deep sandy valley, giving the impression that the land is no good, but once you are up on the benches the wonder is that such good land was not long ago taken up. As a further proof that the country is good, two of my men who came to work on the survey for the express purpose of seeing and taking up land, after travelling all summer, took up homesteads at this place.

To adequately protect the country against forest fires a regular patrol system is required such as the police system in a city, where every officer would have a beat and be obliged to cover every day with an officer in charge to see that those duties are performed. A severe penalty should be provided and strictly enforced for any person who leaves a fire burning either during the danger season or out of it. I would strongly advise that no fire of any kind be left either during the danger season or out of it, as this to a certain extent gives the people the privilege of judging if there is danger; therefore, fires are left, a wind comes up, and from one to ten thousand or more acres of virgin forest are destroyed. It requires only a few moments consideration to realize the loss from inefficient fire protection and that in a few years the natural inheritance of the settler will be gone.

The West will in about another year have three systems of transcontinental railway service, but, at the present rate of immigration, before many years a fourth and fifth system will be required and, since rates are regulated to a great extent by competition, and more particularly competition by water, I think a thorough examination of the Saskatchewan river with the end in view of connecting the east slope of the Rocky mountains with the Atlantic ocean, either by way of Hudson bay or the Georgian Bay canal should be given serious thought. Taking a bird's eye view of the country from the Atlantic to the Rocky mountains it looks like a gigantic undertaking, something impossible, but that view must be relegated to the 'old-fashioned.' We are living in an age of progress, an age where nothing is impossible. Some will say, 'The Saskatchewan river is too swift and the bottom consists of shifting sand bars.' To these I would reply, 'Dam the river every forty or fifty miles and put in a lift lock.' The dams will make a waterfall, which can be used to develop mechanical power, and on the banks factories can be built to manufacture the products of the country at home. To dam the river is not an impossibility, as can be proved by the damming of the Nile in Egypt. Saskatchewan river has high banks on both sides; the back water would do no damage; there would be no current and consequently no shifting sand bars.

In olden times the Hudson's Bay company brought out their furs and took in supplies by means of York boats. Therefore, to-day it is possible to deepen the same waterway and have a twenty-one foot water service all the way across the continent. If the Government will undertake to complete this work the future sons of Canada from generation to generation will read their names in history with respect and say 'They are the men who made Canada for Canadians.'

I have the honour to be, sir,

Your obedient servant,

G. J. LONERGAN, D.L.S.



## APPENDIX No. 30.

## REPORT OF A. McFEE, D.L.S.

## RESURVEY OF THE BOUNDARY OF BUFFALO PARK RESERVE.

RED DEER, ALBERTA, February 10, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour, in accordance with your instructions of March 16, 1908, to submit the following report of the resurvey of Buffalo Park reserve boundary, situated in townships 42 and 43, range 6, townships 42, 43 and 44, ranges 7 and 8, and township 43, range 9, all west of the fourth meridian.

Taking one man with me, I left Red Deer, Alberta, on April 23 for Battleford, Saskatchewan, for the purpose of taking over the transport outfit that Mr. David Beatty, D.L.S., had used during the season of 1907, and which was left with a man named Sayer to winter. I got the outfit, had it shipped by the Canadian Northern railway to Vermilion and from there had it driven across the country to Hardisty, where the party and outfit joined on May 1, and got to work in the field on the 4th. Commencing at the northeast corner of section 23, township 43, range 9, west of the fourth meridian, running south, I retraced the original surveyed lines, restoring monuments where necessary. Iron posts marked '4' on the flat sides facing the direction of the line were planted at all quarter section corners where they were required. Along the centre line of a section, according to where the park boundary was located, pickets of a uniform size were driven solid in the ground at frequent and suitable intervals. Where the park boundary followed along the north or east side of a road allowance I placed pickets by offsetting them one chain at right angles to the original surveyed line.

The country throughout the whole park, as well as what I could see surrounding it, is well watered, has good grass, is rather hilly and rough, with scattering bluffs of poplar and willow. It is park like, has numerous lakes and coulées, and the soil is light with three to four inches of sandy loam on sandy subsoil. Ribstone creek runs through the southeast corner of it, having wide flats along each side, where almost any quantity of good blue-joint and slough hay can be cut. There is only one squatter inside the park, on the northeast quarter of section 4, township 43, range 6. There are some beautiful lakes in the northeast corner of the park near Wainwright, on the Grand Trunk Pacific railway. There is an old trail called the Battleford trail running diagonally across the park from near Hardisty to Wainwright. The northwest part of our work ran through a hilly and rough country, with deep ravines and gulches leading to Battle river. A large portion of the country in the vicinity of the park is suitable for mixed farming, with plenty of wood for fuel. I did not notice any coal or rock. Small game such as ducks, plover, snipe and prairie-chickens are plentiful, but we did not come across any large game. No frost occurred during the time I was in the field.

I have the honour to be, sir,  
Your obedient servant,

A. McFEE, D.L.S.



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## APPENDIX No. 31.

## REPORT OF GEORGE McMILLAN, D.L.S.

MISCELLANEOUS RESURVEYS IN CENTRAL SASKATCHEWAN.

OTTAWA, February 10, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on my survey operations in the province of Saskatchewan during the season of 1908.

In compliance with your instructions, dated April 21, I left Ottawa on the 28th and proceeded to Lac du Bonnet, Man., to procure the outfit assigned to me.

From there I proceeded to Saskatoon, arriving there on May 7. I at once organized my party and started for township 35, range 5, west of the third meridian, where I did seven miles of resurvey. The sky was clouded all the time and prevented my getting an observation. This township is almost entirely a rolling prairie, and the soil is of a good quality of sand. It is well settled, and to a large extent cultivated. Considerable wheat and oats are raised, and the settlers are apparently prosperous. Good water can be easily procured. There are some small bluffs of second growth poplar; these are as yet unimportant, but they are guarded and protected. I finished my work in this township on May 18, and left for township 49, range 25, west of the second meridian, and, having driven all the way, I reached there on June 1.

While in this township the rainfall was excessive, and there were two hail storms. Fortunately, however, there was no damage done. This is a small township, and along Saskatchewan river there is a narrow strip of excellent land wooded with poplar. Farther from the river the soil is lighter, and was once well covered with jackpine. Much of this jackpine has been cut into cordwood, and forest fires have destroyed much, yet a considerable quantity remains. Deer are numerous. I saw no signs of minerals, but there are large deposits of building sand and brick clay, and a brick factory is in operation in section 22. The water is good all through the township; except in the vicinity of the river; the soil in this township is not suited to farming or stock raising. The grazing is poor. I think it serves a good purpose in growing timber.

I made a traverse of the north bank of the river through the township. This was a trying piece of work in the month of June. During that month the river was full and overflowing, so the shore could not be followed and almost the entire traverse had to be cut through the thickest and most luxurious growth of willow. This finished my work there and on July 14 I left for township 42, range 1, west of the third meridian, arriving there on the 17th.

The river lots in this latter township are mostly settled on by pioneers and stock raising is the principal industry. The other lots are settled on by immigrants and others who pursue real farming. With them I saw many wheat fields and later on good samples of grain. There is an abundance of timber for fuel and other purposes. The south branch of the Saskatchewan river traverses this township and west of the river the soil is quite sandy and the surface more rolling and open than east of the river. The banks of the river are very high and no lands are flooded.

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There has recently been a new ferry put in operation near the northeast corner of section 18, which is known as Gabriel's crossing and a good road leads to Rosthern therefrom.

The same conditions apply to townships 43 and 44, range 1. Batoche is the centre of business for these two townships. The residents east of the river have access to the Canadian Northern railway ferries at Batoche and St. Laurent.

The last work to be done in the above townships was a traverse of South Saskatchewan river which was completed on December 28. On the following day I moved into Duck Lake settlement, stored the outfit for the winter and left for the east, arriving in Ottawa on January 4, 1909.

I have the honour to be, sir,  
Your obedient servant,

GEO. McMILLAN, D.L.S.

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## APPENDIX No. 32.

## REPORT OF C. F. MILES, D.L.S.

INSPECTION OF CONTRACTS AND RESURVEY IN SOUTHERN SASKATCHEWAN.

TORONTO, March 1, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report on my operations in the field during the past season in southern Saskatchewan. The work consisted in part of restoration surveys of townships, inspection of subdivision contracts, and investigation and correction of disputed boundaries under instructions dated April 3, May 15, June 10, June 29, July 4, August 6, and October 10, 1908.

On April 11 I engaged a man in Toronto to proceed to Chaplin in order to collect my outfit, and to prepare my horses for the ensuing season's work. After feeding up the horses he hired a couple of men, to assist him in bringing the outfit to Craik on the Canadian Northern railway, a distance of about eighty miles, arriving there about April 25 where the whole outfit was overhauled, wagons painted, and harness repaired. I left Toronto on April 21, and after spending a couple of days in Winnipeg in order to collect my instruments and purchase some supplies, I arrived in Moosejaw on the 26th where I stayed over a day to interview some cooks who were offering their services.

I arrived in Craik on April 29, my senior assistant arriving on May 1. We started the following afternoon for township 23, range 1, west of the third meridian, arriving there on May 3.

It is well settled all along here and no more land is available for settlements. The soil consists of a black loam varying in depth from two to eight inches with a subsoil of about two-thirds of clay and the rest mostly sand, though in a few instances a gravel subsoil.

Restoration survey of this township was completed on May 18 and on the following day I broke camp and started with the outfit for Caron by way of Brownlee. I found there was no trail south through the hills from Caron so moved up to Telegraph trail near Moosejaw. After laying in some supplies at Moosejaw, oats for horses and wood for fuel, I started south on May 23, arriving in township 11, range 1, on the 25th where I traced a few lines and on the following day moved camp to section 5, township 10, range 28, west of the second meridian. Here I traversed the shores of parts of 'lake of the Rivers,' until the 29th when I moved camp back to township 9, range 1, west of the third meridian. I retraced some of the lines in this range down as far as township 6, taking observations, measuring angles and examining some corrections that had been made in the spring of 1908, in contract No. 13 of 1906. A number of new settlers had taken up homesteads in range 1, in townships 6, 7, 8 and 9 since last year. This section of country has much to commend it to the new settlers, save the want of fuel and scarcity of water; the latter difficulty, however, may be overcome to a great extent as soon as well boring appliances can be brought to work. Coal, although of an inferior quality, may be found in several places east of the 'lake of the Rivers.' The wood yet remaining in the northerly part of Wood mountains up as far as Twelve-mile lake is being rapidly diminished, and if it is desired that it be saved from entire

destruction, it will be found necessary to appoint a conservator for the purpose of preventing settlers from making heavy inroads into the green timbers and confining them strictly to using the dry and firekilled trees.

I broke camp again on June 8 and the outfit started for Moosejaw. Not being well myself, I drove in light and arrived there on the following day. On consulting a physician, I was advised to go to a hospital, my complaint being diagnosed as typhoid. My outfit arrived on the 10th and left on the following day for township 23, range 4, via Mortlach in charge of Mr. Stewart, my senior assistant, where they arrived on the 13th, passing through a well settled country which has been previously described.

While I was being treated at the Moosejaw hospital my party in charge of Mr. Stewart assisted by the junior assistant surveyed township 23, range 4, west of the third meridian. The new extension of the Canadian Pacific railway northwest from Moosejaw, traverses this township diagonally and the line was only partly graded at the time of the survey; since then the steel rails have been laid causing a considerable amount of traffic between its present terminals, Outlook and Moosejaw. The soil is rather light, nevertheless, most of the available homesteads have been applied for. A range of sand hills extends through parts of townships 23 and 24, ranges 3 and 4. These are covered mostly with scrub and brush, but in townships 23 and 24, range 3, there is yet a good deal of growing timber suitable for fuel and poles. Up to the present, settlers within a radius of nearly thirty miles have hauled their supply of fuel and poles from here, and it will be but a very short time until the supply is exhausted. It is not alone that the neighbouring settlers draw their own supply of fuel from these hills, but as I am creditably informed, there are some people who draw the wood into the towns situated along the line of railways, where they sell it. These settlers along the railways from Craik to Davidson on the Canadian Northern and from Eyebrow to Elbow on the Outlook branch of the Canadian Pacific railway, can draw their supply of fuel from these railways, as may also many of the settlers living within fifteen or twenty miles of these railways. In November and December last, while I was camped near these hills, dozens of teams daily were observed coming from the hills with large loads of wood. I believe it would be to the interest of the community at large to put a stop to this devastation by the appointment of a fire ranger or a forest ranger to watch, that no more green wood be cut either for fuel or fencing purposes. We finished the restoration survey of township 23, range 4, on June 29, and from here moved camp to Chaplin and Ernfold; in the latter place we made some changes in the subdivision of the townsite and at the former place took additional measurements of angles and distances. On July 8 I moved camp to Mortlach, the thermometer registering 93 degrees in the shade at noon, I laid in a supply of provisions and horse feed and started at sundown for the south to commence the inspection of subdivision contract surveys. On the 14th I reached section 10, township 9, range 6, west of the third meridian. Here we were overtaken by a heavy thunderstorm and camped. From Notukeu creek along the Gravelbourg trail the country is pretty well settled south to a range of hills in township 9; south of the hills there are but few settlers. My first camp on inspection work was on Pinto creek on section 13, township 8, range 8, west of the third meridian. The valley of the Pinto here is wide, but of little practical value, the soil consisting of a stiff white clay commonly called gumbo, and generally covered with sage brush.

Here for the first time I met with a bird I had not seen before anywhere in the territories, it is the sage hen and in size about as large as the domestic hen, but otherwise has the appearance of an ordinary grouse. In this contract, No. 1, consisting of twenty-four townships, I inspected sixteen townships and retraced about seventy miles. There were only about half a dozen settlers observed in this contract at the time of my examination; the land is somewhat hilly, though the soil is good and the prospects of an early settlement are promising. At the time of my inspection the

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country was very dry, partly owing to the small snowfall during the preceding winter. The water in the creeks and rivers was not running but standing in pools, and the ponds with but few exceptions were dried up. July was a very hot month and at times the breeze, blowing over the prairie, felt like coming out of a hot oven, therefore, whenever I found it necessary to travel with the outfit, I made use of the very early morning or the late evening.

The inspection of contract No. 1 was completed on July 24 and on the following morning we broke up camp and started across country southeasterly for Wood river, where we arrived on the morning of the 26th and camped on section 7, township 6, range 6, west of the third meridian, in contract No. 13. This contract covers twenty-four townships out of which I inspected sixteen, retracing seventy-one miles and taking four observations for azimuth.

The southern portion of this contract is rather hilly and somewhat broken by ravines; it is traversed by creeks, containing pools of water and is more particularly adapted for grazing purposes. Wood river traverses this contract from south to north and at the time of my inspection was not running but contained water standing in pools. Most of the small creeks emptying into the river contained pools of water which was all more or less impregnated with alkali. The greater part of the contract is hilly and rolling prairie. No timber or brush of any description grows and settlers procure their supplies of fuel and fence posts from Wood mountains, southeast of this contract. Not many settlers improvements were observed south of the third base line, though quite a number of shacks and patches of plowing were seen to the north and east. Travelling through township 8, range 5, we saw a few antelope grazing in a dry slough.

On August 6 we broke camp and started with the outfit for the ford on Wood river; here I camped and repaired camp outfit, &c., that suffered much damage during a heavy storm on the night of August 1. We camped here waiting for the teams to return from Moosejaw with mail, provisions and horse feed, and on the 10th moved north past Gravelbourg post-office to the old Fort Walsh and Moosejaw trail. There is a bridge now across the Notukeu. We did not, however, cross the creek but followed the old trail westerly fording the creek in township 10, range 10, and entering the next contract, No. 9, on township 9, range 13. This contract comprises twenty-four townships and parts of townships. I examined seventeen townships and retraced eighty miles. The northeasterly portion of this contract is partly rolling and partly hilly; there are quite a few ponds among the hills and the land appeared well adapted for cattle raising. Numbers of range cattle and horses were observed. Frenchman river traverses eight townships of this contract; when full and running, it is from seventy to one hundred feet wide, but at the time of inspection the river was dry in many places, the water merely standing in pools. The immediate banks of the river are from ten to twenty feet high and precipitous. The valleys are wide and the prairie level, mostly two hundred to five hundred feet above the level of the river. There is a crossing of the river and easy access to the valley in township 5, range 16, another in township 3, range 13 and another in township 4, range 18. There is no timber but some brush grows along the banks of the river; wood for fuel and fencing however, may be procured from the easterly slope of the Cypress hills. A fairly good quality of coal is said to exist in township 7, range 19. No cultivation was observed in any of these townships that I examined. As far as I can judge the townships are well adapted for cattle and horse raising, but in the future when the railways projected become a fact, there will be a good field for settlers. The valley above the last mentioned crossing becomes somewhat cut up by ravines and is only accessible by the trail crossings above mentioned.

On the 22nd, one of my horses, a black gelding, succumbed to what experienced ranchmen pronounced 'alkali poisoning.'

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I completed the examination of contract No. 9 on August 29 and moved up to the next one west, contract No. 3, the following day, travelling along the plateau north of the river by a good trail. We experienced a slight white frost on the morning of September 1 in the valley of the river. My camp previous to the last was on section 29, township 4, range 17, close to the winter camp of the 'T down' ranch (J). My first camp in contract No. 3 was on section 12, township 6, range 21, adjoining the home ranch of the same company. There is quite a wide valley, but it is eaten bare with all the cattle grazing here. There are twenty-eight townships and parts of townships in this contract, twelve being on and adjacent to Frenchman river, eight on Battle river and eight adjoining the fourth meridian. Of these I inspected sixteen, retracing fifty-one miles. From the home ranch of the 'T down' outfit, more or less irrigation work has been done up Frenchman river. We passed through the Z-X ranch, owned by Messrs. Enright and Strong, where they appeared to have excellent crops of wheat, barley and vegetables. I understood several hundred thousand dollars had been expended in irrigation. There are probably half a dozen settlers in this contract scattered along the river, all more or less engaged in cattle or horse ranching. On September 4 we broke camp and in order to reach the prairie level had to put four horses on the wagons to haul them out of the valley. On my way to Battle river portion of this contract I measured the east boundary of section 24, township 5, range 23, and found iron posts in witness mound marked correct. Frenchman river bounds the Cypress hills on the south side of the last two townships. The hills are about five hundred feet above the level of the river. There is some good spruce on the south bank of the river but it is being rapidly exhausted. At Battle river I retraced sixteen miles then moved on to Lodge creek on the fourth meridian; here I also retraced eight miles. There are a few settlers along these streams, but no cultivation to any extent was observed, the main industry being the raising of cattle and sheep; this section of the country is well adapted for that purpose. The most westerly contract examined was No. 8, being all in the province of Alberta. There were twenty-five townships in this contract, twenty-four of which were subdivided; here I retraced a few lines in thirteen townships. Four of these townships were subdivided by the late Mr. A. G. Stacey, who died at the Medicine Hat hospital shortly after his removal there. He was succeeded by Mr. A. Driscoll, who finished this contract. The work on this contract was found satisfactory and well up to the standard. There are probably ten or twelve settlers in the area comprising this contract who are engaged in cattle ranching. I was informed that on the west side of lake Pakowki, almost dry the past summer, there were some large herds of sheep. Owing to the drought during the past summer and scant snowfall the preceding winter, the country had a very dry appearance, the water in some of the lakes having disappeared altogether, one of these being Wildhorse lake in township 1, range 2, west of the fourth meridian along the international boundary. I finished inspection of these contracts on September 24, leaving the only one yet to be visited, No. 15, east of the third meridian. Owing to a long drive, about three hundred miles, back to this contract, the scarcity of fuel and water and the bad quality of the latter, I concluded to drive to Medicine Hat, load my outfit on a train and have it taken by train to Weyburn on the 'Soo' connection of the Canadian Pacific railway. Therefore on the morning of September 25, when during the previous night snow had fallen to a depth of about four inches, I broke camp and started for Medicine Hat. I succeeded here in obtaining a large car that took the whole outfit on the 29th. This car containing my outfit arrived at Weyburn on October 3. Laying in a fresh supply of provisions here I started on the 5th, passing through a well settled and almost level country. I reached contract No. 15 on the following day and camped on section 30, township 3, range 19, west of the second meridian, entering hilly country a few miles back. It was apparent by the growth of the grasses that this part of the country had been more favoured with rain than the part passed through lying west of the third meridian, the growth in places being almost

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luxuriant. There were twenty-five townships in this contract, and I retraced lines in sixteen of these. Much of the area covered by this contract, more particularly east of Big Muddy creek is hilly. No settlers were found here except a few on the Big Muddy near the Royal Northwest Mounted Police post on section 9, township 1, range 22, west of the second meridian; they have cattle and horses. Hay appeared plentiful in the valley of the creek but from the price some of these settlers have the face to charge for beef, one would think that cattle were very scarce, and hay still more so. One of these men asked twelve and a half cents per pound for a quarter of beef he had just killed; that is the figure he is said to receive from the Royal Northwest Mounted Police authorities; however, I declined this liberal offer, having a couple of months previously purchased as good beef from another settler at seven and a half cents a pound, and at Weyburn butcher shops for eight cents per pound. While camped in this vicinity Corporal Edgerton brought some mail for me from Willowbunch, about fifty miles northwest. This being a quarantine station, there is a government veterinary surgeon stationed here, of whose presence I took advantage to have my horses' teeth filed, and also the breast of one of my mares treated where she had a running sore, caused by the injury received in transit on the Canadian Pacific railway. Our last camp in this contract was on a pond in township 3, west of the second meridian; here we experienced our second snowstorm this autumn and on the following day there was six inches of snow on the level. It happened that we got only the tail end of the storm, it being very much more severe about the Cypress hills, where several thousand sheep perished, also one or two men, and the railways between Medicine Hat and Swift Current were blocked for some days, whereas in this neighbourhood it was raining for a week more or less, with occasional snowfalls. There is still a quantity of poplar wood left, west of the Big Muddy though much of it is firekilled. The country too is considerably broken by ravines along townships 3, ranges 25 and 26. My outfit arrived at Willowbunch on the 18th where, owing to stormy and wet weather, they remained until Wednesday. I in the meantime started for Moosejaw in a light rig; my party arrived on the 24th, with horses very much played out on account of mud and heavy roads, and left again in charge of my assistant for township 23, range 3, west of the third meridian on the 26th, where they commenced the restoration survey of township 24, range 3, on October 29. With a small party, according to instructions, I left Moosejaw in the evening of the 26th for Estevan; here I engaged a conveyance to drive us to Dupuis postoffice in section 34 township 1, range 12, west of the second meridian, on the following morning, arriving there the same evening. Here I investigated the errors complained of in sections 29 and 32 by running a trial line north from the southeast corner of section 5, on the international boundary and along the east boundaries of sections 5, 8, 17, 20, 29 and 32, of which I returned sketch and field notes to the Department. The country from Estevan and Dupuis is well settled. Much of the grain raised about Dupuis is being marketed across the line where there are elevators within about five miles of the international boundary. I returned to Moosejaw on October 30 where we remained until the following Monday, the day the train left for the north which we took for Tugaska. From here we drove to camp on section 5, township 24, range 2, where my assistant was at work upon township 24, range 3. The greater part of this township is covered by sand hills, only about the two most northerly tiers of sections being available for farming purposes. There are some pretty fair feeding grounds among the hills which are covered to some extent by brush and some clumps of poplar, mostly second growth. Whatever of the latter is suitable for either fuel or fence poles is being rapidly removed by the settlers. The sand hills extend westerly into township 24 and partly into townships 23, ranges 3 and 4. On November 5 I left camp again with a small party for Tugaska, thence by rail to Brownlee, from there we drove on the following day to township 19, range 29, west of the second meridian, investigating errors said to have been made in the original survey. Here we re-measured the south boundary of this township and ran around sections 4 and 9 dividing these into equal



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east and west halves, as requested by petition from settlers interested. The whole of this country is well settled and the grain raised is shipped by way of Mortlach and Caron on the main line, and by way of Brownlee and Keeler on the Outlook branch of the Canadian Pacific railway. It was storming most of the time I was engaged here. I returned to my main camp in township 24, range 3, west of the third meridian, on November 11. On the 13th the thermometer registered 10° below zero; I moved the whole camp to section 27 in township 23, range 2, where I purposed making a traverse survey of Eyebrow (Sandy) lake. The marshes to the southeast and northwest as well as the lake itself were frozen, so we found no difficulty in getting around it. We completed this traverse on the 16th and then moved camp to section 35, township 24, range 3, in order to be near a well at the school-house in section 2 in the adjoining township north. The school-house is a fine building for this part of the country and was put up at the cost of \$1,000. Although the land is very light in the northern part of this township yet it appears to be all occupied and settlers thriving. I may mention here an instance where a family lately out from England are doing remarkably well. One of the sons arrived in Manitoba about six years ago with only two dollars in his pocket; he worked for a farmer and saved enough to send for his brother the following year; the two still working for wages succeeded in bringing out the rest of the family, mother and four children. The following season, and last year, owning five quarter sections between them, they had 3,400 bushels of wheat from which they realized about \$2,700. These people, at home, had been working in a factory and living from hand to mouth, and now they are possessors of their land, homesteads, cattle, horses, pigs and poultry. I considered it a remarkable case of thrift.

Having ascertained that the trails south of Medicine Hat were again passable, a small party started in the morning for Craik thence via Regina to Medicine Hat. Here a conveyance was procured to make the trip south to contract No. 8, which could not be accepted on the first inspection owing to four townships not then having the monuments established. On this second inspection it was ascertained that everything had been completed and the pits dug out to requirements. On the 30th with the thermometer registering 15° below zero, the party returned from examining contract No. 8 in southeastern Alberta. The frost had now penetrated so deep into the ground that I decided not to dig any more pits after the resurvey of township 24, range 3 was completed. On December 5, with a small party, I started for Swift Current by way of Elbow and Moosejaw in order to investigate some alleged error in the original survey of section 24, township 18, range 14, west of the third meridian. On Monday morning I engaged a conveyance and drove out to Knead Anderson's place. Measuring up along the east boundaries of sections 11 and 23 we discovered a gross error; here we also took an observation on Polaris and returning we arrived at Swift Current the same evening. I returned to Moosejaw the following evening and started for Eyebrow the next morning. From here I remeasured intersections of the section lines with the railway line (the Moosejaw to Outlook branch of the Canadian Pacific railway) and on the 12th left Eyebrow driving to township 23, range 2, where we camped, took an observation and also remeasured some of the section lines.

I completed the restoration survey of township 24, range 4, west of the third meridian on December 17 and on the 18th moved camp to township 23, range 2. On the 21st I started with a small party for township 19, range 29, west of the second meridian where I made some additional measurements. The following day I began to pay off some of my party and on the 24th moved my outfit from Tugaskie to township 21, range 5, where the outfit was stored and horses wintered. From the time of my arrival in Moosejaw in the spring until my departure for home I travelled with my outfit about two thousand eight hundred miles. On December 26, I paid off the rest of my men and started for my home in Toronto.

I have the honour to be, sir,

Your obedient servant,

C. F. MILES, D.L.S.

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## APPENDIX No. 33.

## REPORT OF R. H. MONTGOMERY, D.L.S.

MISCELLANEOUS SURVEYS IN NORTHERN SASKATCHEWAN.

PRINCE ALBERT, April 21, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report on surveys performed by me during January and February, 1909.

Under your instructions of November 24, 1908, I carried out a miscellaneous survey through northern Saskatchewan, driving by team a distance of about five hundred miles, covering only about sixty miles of this distance twice. Consequently considerable territory was covered. The temperature was severe at times; during the first two weeks it ranged between  $-30^{\circ}$  and  $-40^{\circ}$  Fahrenheit, dropping as low as  $-60^{\circ}$ ; at the same time a fair wind was generally blowing. During the remainder of the time it averaged about  $-10^{\circ}$ . All kinds of trails were experienced, the worst being found between Meeting and Birch lakes, north of Battleford. Here we found trails which had not been broken this winter. Time and time again our horses could not force their way through drifts and we found it necessary to break for them. We carried no supplies except oats, depending entirely upon homesteaders for sustenance and were consequently vividly impressed whenever we came to a destitute settler, which was the rule rather than the exception, bread or bannock and tea being the standard diet. The farmers generally are thrifty, the stock as a rule being far better fed than the family.

We left Prince Albert on January 7, 1909, driving through a bush country which seemed to be only inhabited for the cordwood which is its chief industry. After passing Duck Lake settlement and turning westward, the aspect changed, the country opened up more and more and farming here is apparently carried on prosperously. On the way we passed through three Doukhobor villages; it was noted that little advancement had taken place in the general appearance of these since I was in that locality in 1904. They seemed rather to have deteriorated.

Arriving on January 11 at Redberry lake we proceeded with the survey as directed. The country surrounding the north end of the lake is settled by Galicians, who are making good farmers. They live in houses made of mud. The mixing of this mud is an art in which they excel. As a rule they are the cleanliest of our cosmopolitan population. Here they adhere to the Greek Catholic church and maintain the holidays of their motherland. These holidays seem to be numerous, three of them occurring during the twelve days that I was in that locality. January 14 they still observe as the new year. The longer they remain in this country, the less they adhere to their holidays. They report that both Blaine and Redberry lakes have a very bad odour in summer. The snow here averaged about one foot in depth. The country is rolling prairie and well adapted to farming. During January 21 and 22 a blizzard raged and on leaving Redberry lake on the 23rd we found all trails in the country obliterated. We travelled in a northwest direction through stony and hilly country fit only for ranching, which is being carried on here, until we arrived in

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township 46, range 12. Here the land is well settled and the soil excellent for agricultural purposes. The least snow on the whole trip was found here, there being only about three inches on the level. The settlement extends to Meeting lake and consists of English, Irish and Scotch. From Meeting lake to Birch lake, the country is but sparsely settled, becoming more wooded and more difficult for clearing as one approaches Birch lake. The homesteaders here are in very poor condition to withstand the severe winter months. Their nearest point of supplies is Battleford and such is the condition of the trail that the settlers usually have to be on the point of starvation before undertaking the trip. The snow around Birch lake was eighteen inches on the level. On the shores of Birch lake we stopped at a homesteader's whose Scotch father had in the early days homesteaded in Manitoba and whose farm was six miles away from water. Being impressed with the lack of water, one settler has here homesteaded a quarter section consisting of fifty acres of land and one hundred and ten acres of water.

After accomplishing what surveys were necessary in this vicinity, we retraced our route to township 45, range 10, thence taking a more northerly route in order to obtain a better trail. We passed Muskeg lake and Marcellin on the way. All of this country is well settled and being farmed steadily. We arrived in Duck Lake on February 6. From here we continued in an easterly direction to Basin lake in township 42, range 24, west of the second meridian. The country is well settled by Mennonites, Galicians and German Catholics and is principally park country, farming being carried on prosperously. On the west side of Basin lake there is a colony of old country French, being by far the most destitute of all the settlers we encountered. From Basin lake a northwesterly direction was pursued to Fenton on the Canadian Northern railway. This country is level and well settled and covered with considerable woods except where it has been cleared. Mixed farming is being carried on. From Fenton to Prince Albert the country is rolling with scattered bluffs of poplar. Here is some of the best farm land seen on this trip, but farming is not carried on extensively as most of the land is owned by speculators. We arrived in Prince Albert on February 15.

I have the honour to be, sir,

Your obedient servant,

R. H. MONTGOMERY, D.L.S.

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## APPENDIX No. 34.

## REPORT OF J. E. MORRIER, D.L.S.

## SURVEY OF THE TOWNSITE OF FORT CHURCHILL.

MONTREAL, Que., February 26, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour, in accordance with my instructions dated May 26 and June 5, 1908, to make the following report on my surveys at Fort Churchill during the season of 1908.

I left Ottawa with my assistant on June 6, and proceeded to Winnipeg, where I was to take the canoes left there by Mr. Thibaudeau. After examining these carefully I found them unfit for my trip. I, therefore, purchased one Peterboro canoe 18-ft. x 42-in. x 18-in., and decided to rent another at Norway House. While in Winnipeg I met Commissioner Perry of the Royal Northwest Mounted Police, and I learned that arrangements had been made with the Hudson's Bay company to transport the Churchill patrol from York Factory to Fort Churchill in their coast boat 'Strathcona,' which was expected to leave York on July 15. Mr. Perry advised me to procure some provisions, as he was unable to say what they had at Churchill. After several interviews with Mr. Chipman, commissioner of the Hudson's Bay company, he finally agreed to take three more passengers on board the *Strathcona*.

I, therefore, bought some provisions and left on June 12 via Selkirk for Norway House, where I was compelled to remain five days. While there I made a few magnetic observations. On the 22nd I left Norway House for York Factory with canoes and Indian guides, following the Echimanish and Hayes rivers, arriving at York Factory July 5. On the way down I had stopped at Oxford House to make some magnetic observations.

Owing to floating ice along the coast the *Strathcona* did not reach York until the 17th. She was leaking so badly that she had to be beached for repairs. We finally left York on the 23rd, and landed at Fort Churchill on the morning of the 25th, having been favoured by a good breeze.

On the 27th we set up camp on the east side of the river, and began the survey according to instructions.

Progress in our work was rather slow owing to high winds and rain which fell nearly every day. This drawback, coupled with the fact that the native help proved to be absolutely useless, was most aggravating and compelled me to give up the digging of pits at block corners, and to make them at section corners only.

The northern part of the eastern peninsula was blocked out as far south as 17th avenue, the remainder was laid out in sections only.

The season being far advanced I did not subdivide any of the blocks into town lots.

On September 16, we moved our camp to the western peninsula and proceeded with the survey, but on October 3 two of my labourers, hired in Churchill, and with whom I had no contract, quit work to return to their shack on the east side of the river. Consequently from that date little was accomplished, as it is almost an impos-

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sibility for only three men to carry on surveying operations. On November 1, having no more firewood, we were compelled to strike camp and move on to the barracks, where we remained until our departure.

I regret to say that I was unable to examine the location of the water-power applied for by Mr. Wm. Beech.

At Churchill the surface is mostly bare and rocky, with clay and boulders in the river flats. A ridge of greenish gray sandstone or quartzite extends to the coast on each side of Churchill river, and on the eastern side stretches eastward along the coast several miles. These ridges consist of a succession of rounded hills, attaining a maximum altitude of one hundred and twenty feet on the western peninsula. On this peninsula the ridge is broken by a marshy gully covered with small spruce and tamarack averaging three inches in diameter. This gully is locally known as 'sea horse gully.' A low, gravelly point extending seaward from the hills forms the western bank of the river immediately at its mouth. On this point lie the ruins of Fort Prince of Wales.

Timber on the eastern peninsula begins at 37th avenue, and consists of small spruce with a few scattered tamarack, averaging four inches in diameter, but farther up the river, along the banks and on the islands some good sized spruce may be found, though not in sufficient quantity for commercial purposes. On the western peninsula, spruce suitable for fuel may be found about two miles southwest of the Hudson's Bay Company's post.

Scales of specular iron were found on both peninsulas. This was the only mineral observed. Good building stone may be found almost anywhere in Churchill; there is also a large deposit of cream coloured limestone along the coast, between 24th and 26th avenue, on the eastern peninsula.

In the neighbourhood of Fort Churchill it would be difficult to grow grain of any kind, owing to the short season, which barely commences in July, and then heavy frosts setting in in September make the summer season only ten weeks. However, vegetables may, on exceptionally good years, have time to mature.

Around Button bay and in the river flats, a good quality of hay grows in abundance to permit the raising of horses and cattle.

There are a few lakes of fresh water on the eastern peninsula, which ought, for a few years, to accommodate a small population, but later on, water could be brought from several large lakes about six miles south of 37th avenue, and the smaller lakes referred to above, could be used as reservoirs. On exceptionally high tide, the flats are liable to be partly flooded.

At Mosquito point, about nine miles from the mouth of the river, there is a small rapid, but it is doubtful if any water-power could be developed owing to the low shore of the river at that point.

Game is plentiful, consisting chiefly of geese, white swans and several varieties of duck. Ptarmigan and partridge are abundant all along Churchill river. Caribou this year were not so numerous as in former years; however, large herds were reported by the Indians and Esquimaux. Polar bears, wolves and Arctic hares are occasionally shot, while ermine, mink, otter and foxes of all varieties, but particularly white foxes, are trapped around Churchill. Numbers of seal of several species frequent the mouth of Churchill river and Button bay, attracted by the abundance of fish at these places. Every spring the Esquimaux congregate along the western peninsula for the purpose of seal hunting. During July, August and September the porpoise or white whale is very common; they can be seen going up the river at every tide in large shoals. Salmon, trout and whitefish of excellent quality are found in the river all the year, but are more abundant in July and part of August.

The land covered by blocks 102 to 108 should be reserved for a park. This is a nice sandy plateau overlooking the sea and the only suitable place for a park in the northerly part of the townsite. In the southerly part, the following blocks should also be reserved for a park:—427 to 431, 467 to 471, 498 to 502, 541 to 545 and 572 to 576.

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The rocky point of the eastern peninsula should be reserved for a lighthouse or signal station. Beacon island could serve a similar purpose, or be used for a wireless station.

The fine but rather small harbour of Churchill lies immediately within the mouth of the river. The entrance is about half a mile wide and is regarded as quite safe. There are a couple of reefs in the mouth of the harbour and if they were removed it would widen the entrance considerably. The harbour is well protected from the north-west by the projecting point of the western peninsula and Beacon island, so that in entering vessels have to describe a curve, but they immediately get away from the influence of the ocean waves, and once inside they are in perfect shelter. The basin, which fills up with every tide, is about nine miles long and averages two miles in width at spring tide. This large volume of water having to pass out of the narrow entrance when the tide goes out, causes a very strong current from the basin. The spring tide is sixteen feet and the neap tide about nine feet. The channel retains the same width at neap and spring tide. Deep water does not extend very far and in the present state of the harbour vessels could go only about one mile inside the mouth of the river, where there is sufficient space to anchor seven or eight ships. However, judging from the nature of the river bed, which appears to be sand and gravel with boulders, a good and large harbour could be made with comparatively little trouble or cost. No difficulty would be encountered in building elevators, wharfs and warehouses along the shore of the eastern peninsula.

According to the information supplied by Major Moodie and the office of the Hudson's Bay Company's post, the average date of opening of the harbour is June 15, but for some time before it closes, which is generally about November 15, it would not be safe for ordinary vessels to venture in, owing to the rush of floating ice in the current. The entrance is also apt to be crowded with ice in the spring, as was the case last season.

We left Churchill with Major Moodie and the police patrol on November 21, and arrived at Split lake on the evening of December 6; at this place we were detained four days, owing to the scarcity of dogs. On the 11th we left Split lake and reached Norway House on the 22nd, having covered the whole distance from Churchill to Norway House (567 miles by winter route) on snowshoes in twenty-eight days, walking an average of twenty miles a day. On my arrival at Norway House I made arrangements for transportation to Gimli, but it was impossible to get Indians to leave the post before Christmas. We therefore left on the 26th, and arrived in Winnipeg, via Gimli, on January 6, 1909. I settled my accounts and left on the 8th, arriving in Ottawa on the 10th.

During my trip to Churchill I was placed under many obligations to Superintendent Moodie of the Royal Northwest Mounted Police, and to a number of officers of the Hudson's Bay company, to whom my cordial thanks are hereby extended.

In conclusion, I wish to express my appreciation of the valuable services of Mr. F. H. Peters, who was appointed as assistant.

I have the honour to be, sir,  
Your obedient servant,

J. E. MORRIER, D.L.S.

## APPENDIX No. 35.

## REPORT OF T. H. PLUNKETT, D.L.S.

## SURVEYS IN THE EASTERN PORTION OF THE RAILWAY BELT.

MEAFORD, January 18, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—In accordance with your instructions dated April 11, 1908, I left Toronto on Saturday, April 25, and reached Kamloops on Wednesday, April 29.

Here I met Messrs. J. E. Ross, D.L.S., and E. W. Robinson, D.L.S., and with them arranged a division of the season's work, by which I took all surveys required west of the fifth meridian, and, having organized my party, we left by the Canadian Pacific railway for Golden, B.C., on May 6. On arriving there I commenced the subdivision into town lots of the undivided blocks of the townsite of Golden.

The town of Golden is most favourably situated being on the main line of the Canadian Pacific railway, and is the northern terminus of the proposed Kootenay Central railway now under construction. No doubt, in a short time this town will become an important railway centre and distributing point for the Columbia valley, extending up to the well known Windermere district, where fruit farming is beginning to occupy the attention of incoming settlers. Fuel, including wood and coal, are easily available, the former from the surrounding country which is well wooded with spruce, birch, and pine, and the latter over the Canadian Pacific railway.

In Hospital creek, Golden has an abundant supply of good water within half a mile of the town. Excellent water-powers can also be easily developed on this creek for manufacturing purposes.

At Golden, the Columbia River Lumber company have a large and up-to-date saw-mill. The supply of merchantable timber in this vicinity is very large and lumbering continues to be, as yet, the chief occupation of the residents.

After completing surveys in the townsite I was engaged, during June and part of July, in smaller surveys along Columbia river for a distance of ten miles above and below Golden. A first class wagon road along the river renders travel easy from one locality to another.

The land in the valley consists chiefly of rich black loam and what clearings have been made, show the land to be well adapted to mixed farming. All kinds of vegetables are raised successfully and small fruits of the strawberry and currant varieties, yield abundantly. Fruit farming of the apple and plum varieties may be said to be in its infancy. There is, however, at present great activity in this branch of farming. There is no doubt, I think, that the bench lands along the river are well adapted for raising plums and particularly apples. The near future will no doubt see great development in this line. This land is well suited for fruit lands, it being for the most part clay loam with gravel subsoil. This soil in most places is not as rich as might be desired, but with intelligent handling it could, I think, be made very productive. If the present activity in fruit farming continues, no doubt in a short time the settler will have, to aid him, expert knowledge of how best to handle this kind of land, with a view to its betterment.



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These lands are wooded with small spruce and poplar, and can be easily cleared. The land is fairly level and can be easily worked. Summer frosts occur in this locality but the apples being raised at present in the valley, though to a small extent yet, show that the frosts are not severe enough to do much damage.

During the season of 1908 the rainfall was sufficient for all branches of farming. Should irrigation become necessary on the bench lands abundant water is easily obtainable from the numerous mountain streams in almost every locality.

The vicinity of Golden has been until quite recently the scene of mining operations to a limited extent. Gold, copper and mica claims are to be found in this locality. These for the most part are undeveloped. In common with other mining districts there has been a decided falling off in the past year or two in this line. Want of capital for development work is the great draw-back; but the probability is that there will in the near future be activity in at least the mica mining.

After completing the surveys around Golden, we left in the early part of July for Albert Canyon station, where I made a small survey. In this neighbourhood there is some fine cedar, spruce, hemlock, and fir timber. The cedars are very large, from four to six feet in diameter. The soil here is a very rich black loam from twelve to sixteen inches. The area of available farming land is limited and the cost of clearing the land would be from one hundred to one hundred and fifty dollars per acre. The future of this locality depends upon its development as a mining and lumbering district. There are, in this neighbourhood, some very fair prospects of gold and copper but at present mining is not active.

The entire absence of mosquitoes at this place, which I believe is characteristic, the beautiful mountain, and river scenery, and a fine hot spring close to the station would render it an ideal summer resort.

From here we moved to Revelstoke and after a small survey left for the valley of the Incomappleux or as it is known in the district "Fish river." We reached this locality by the Canadian Pacific railway from Revelstoke to Arrow Head, Bowman Lumber Company's passenger boat to Beaton, and thence by stage to Camborne. There is a wagon road from Camborne up the west side of the river and a pony trail on the east. From Beaton to Camborne is a very good Government road, but from Camborne north the road is very rough over which the Cartage company at Camborne hesitated to send wagons.

Our first work here was the survey of timber berth No. 528, block VI., in township 22, range 27, west of the fifth meridian. The progress made here was very slow, as I was compelled to keep the camp in the valley and we had to climb up to our work, a great deal of which was from 2,000 to 3,000 feet above the valley.

The valley of Incomappleux river, north of Camborne, is from three-quarters of a mile to a mile wide. In the valley and on the first benches there is an abundance of fine timber. On the west side of the river the timber consists chiefly of very large cedar, with some fir and hemlock. The cedar in the valley is mostly hollow, there remaining an outer rim of from one to two feet of sound timber. On the bench on the west side of the river the cedars are mostly sound, and range from four to six feet in diameter. The fir and hemlock are also very large and sound.

On the east side of the river there is a narrow strip of cottonwood and poplar, but after this the cedar, hemlock and fir are of the same size and quality as on the west. The timber extends on this side up the mountain a short distance, when it becomes smaller. There are no benches on this side except around Boyd creek, and the mountains rise rapidly to a high elevation.

The valley slopes and benches are very thickly wooded and resemble the woods around Albert canyon, though the undergrowth at the latter place is very much heavier.

The land in the valley consists of a rich, black loam well suited for farming, but the cost of clearing the land, which would range from one hundred to one hundred and fifty dollars per acre, will, no doubt, prevent much development as a farming section.

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There is an abundance of spring water in the valley, but on the slopes to the northwest there is absolutely no water, which circumstance rendered our work in the hot weather very trying. The climate is well suited for farming, as no summer frosts occur.

The future of this locality will depend upon its development as a lumbering and mining district.

Good water-powers are available on Sable, Lexington and Boyd creeks, and Incomappleux river is well suited during high water for driving logs to the Arrow lakes. On the mountain sides there are numerous claims of free gold and silver-galena ores. Some of these claims, including the Oyster, Criterion, the Silver Dollar and the Eva, have developed into working mines.

The gold ores are free milling, and the gold being finely divided can be treated by the cyanide process. With the introduction of this process, there will no doubt be renewed activity in gold mining, but the cost of handling smelting ores is too great in this district at present to permit of development. A railroad through this district to the Arrow lakes would develop the mining industry in this section very rapidly.

Goats are plentiful on the mountain side, and some mountain trout are to be found in the river and in flowing creeks. Bears, lynx, weasels, minks and occasionally martens are to be found in the valley.

After completing this survey, I commenced at the northeast corner of section 34, township 21, range 27, to work on the limit of the railway belt. We were unable to use pack ponies, and our progress was rendered very slow.

First class timber, including cedar, fir and hemlock, was found in section 34 and the eastern part of section 28, township 21, range 27, but after this the elevation rendered the growth stunted and small.

The country towards the summit was very rough, and in places water was very scarce, necessitating long walks to our work and great difficulty in man-packing our outfit.

Merchantable timber was not again encountered until, having crossed the summit, we reached sections 19 and 20, in township 21, range 27, where only the southern portions were wooded. The country, until reaching here, was covered with thick brush and ground cedar and hemlock.

Sections 13, 14, 10 and 9, in township 21, range 28, were well wooded with cedar, fir, spruce and hemlock from two to four feet in diameter.

In section 9 our line began to rise again above the timber, and snow on Mount Sproat, the summit of which we had to cross, prevented further work this season.

Game, including goats, bears, deer and caribou, are to be found in this district. The land, on account of its elevation, is useless for agriculture.

The weather during the latter part of our work was very wet, snow and rain almost every day rendering progress slow.

After abandoning this work and completing some work near Golden, rendered impossible during the hot weather by high water on the rivers, I commenced some surveys of timber berths in township 20, range 1, west of the sixth meridian, in the valley of Cranberry creek.

This locality was reached from Revelstoke by taking the Canadian Pacific railway as far south towards Arrow Head as the twenty-fourth mile-post and here crossing the Columbia to a wagon road on the west side. On this road we were able to get as far as the north boundary of township 20, range 1, on Cranberry creek.

Townships 20 and 21, range 1, are thickly wooded with cedar, fir, spruce and hemlock ranging from three to four feet in diameter in the southern portions of township 20 to two feet in township 21. The bush is clean and the timber sound. Cranberry creek is suitable for driving logs, and this timber can be handled and delivered to mills on the Arrow lakes at a very small expense, about probably six to eight dollars per thousand.

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The soil in some places along Cranberry creek is suitable for farming, but for the most part the soil is too sandy. Nearer the Columbia first class farming land is to be had which can be more easily cleared.

The climate permits of all kinds of farming operations.

This closed my season's work, and we proceeded to Kamloops, where my outfit was stored for the winter.

I have the honour to be, sir,  
Your obedient servant, .

THOMAS H. PLUNKETT, D.L.S.

## APPENDIX No. 36.

## REPORT OF A. W. PONTON, D.L.S.

## SURVEY OF THE FIFTH MERIDIAN FROM TOWNSHIP 77 TO TOWNSHIP 107.

MACLEOD, ALBERTA. February 5, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on the survey of the fifth meridian, between townships 77 and 107, inclusive, in the Athabaska district, in accordance with your instructions of February 21, 1907.

Transportation being the main difficulty, I had your permission to visit Edmonton before starting on the survey, to make enquiries from the Hudson's Bay company and other fur traders carrying on business in the district, as to the best means of access, provisioning a party, &c. I therefore remained in Edmonton from February 11 to 28, and obtained all the information possible. Supplies were ordered at the same time and arrangements made for their shipment. A part were to be sent to Moose portage on Athabaska river, near where it is crossed by the meridian, and the larger part to Wabiskaw lake, fifty miles farther north. It was essential that supplies should be taken to Wabiskaw by way of the winter road, which had just been completed by the Alberta government, as the summer water route, by way of the Athabaska and Pelican rivers, is not favourable to transportation, owing to low water in the latter river. The weather during February had become milder, snow was fast disappearing, and freighters hesitated to undertake the trip, but the return of severe cold and snow at the end of the month removed the difficulty, and supplies were at length shipped.

As pack horses were to be required, enquiries were made in every direction in the vicinity of Edmonton, but it was soon found that the Grand Trunk Pacific survey parties had swept the country clean, and that I would have to look elsewhere. The horses were eventually obtained at Cardston and I may here mention that they proved satisfactory, being gentle and well broken.

The winter of 1906-7 will long be remembered for its severity and length. It was so protracted that it was well on in June before grass was available for horses. Actual start in the survey was consequently deferred until then, or six weeks later than in ordinary years.

My party left Edmonton on June 20 for Athabaska Landing. On my arrival at that point I learned that the trail I had proposed taking had been obstructed by forest fires between Baptiste lake and Moose portage. I therefore decided to send the horses light, in charge of a half-breed guide, to save chopping out a new road, and to take my party to Moose portage by steamer. The river was in flood at this time, which would, in any case, have made it necessary to await the steamer at Moose portage to cross the horses over to the north side. By July 5 the party, pack horses and camp equipment were on hand at Moose portage for a start into the wilderness of bush, swamp and mountain. I expected to pick up Mr. H. W. Selby's trail where the meridian crosses Moose lake, and to follow it to the northeast corner of township 76, as far as he had run the meridian, which was my starting point, but in this I was disappointed. His trail had evidently been cut out during a dry season, and

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proved for the most part impassable during the wet season with which I had to contend. It was found necessary, therefore to cut out a new trail around the south shore of Moose lake and north along the meridian to my starting point, a distance of approximately forty miles. This proved an arduous task, owing to the swampy nature of the country lying south of the Pelican mountains. It had been rendered almost impassable for pack horses by heavy rainfall, and as they were unaccustomed to the work at this time, they would become mired when crossing soft ground, which they eventually learned to cross without difficulty.

Our starting point was reached on July 24. Work was commenced on the 25th and continued until August 2, when it became apparent that I had underestimated the quantity of supplies required to reach Wabiskaw, my main base, so I decided to return at once to Athabaska Landing and procure what was necessary. I had also at this date gained sufficient knowledge of the country to convince me that native labour would be of more value than that of several members of my party, who showed little courage to face the insect pests, which were indeed abnormal, or the wet conditions and other hardships incident to a survey in this district. My cook had also proved a failure, and I decided to discharge all unsatisfactory members of my party and take them back to Athabaska Landing. A start was made on the afternoon of August 2 and the Landing was reached on the 5th. Supplies were at once purchased from the Hudson's Bay company, and arrangements made for their shipment to Moose portage by steamer on its arrival from Grand rapids. I then proceeded to Edmonton to procure a better cook and a reliable head chainman. In this connection I may quote Mr. R. W. Cantley, in his report for 1906-7. 'The universal prosperity of this district during the past year and the great activity in railroad construction, building, farming and lumbering have resulted in creating an unlimited, and therefore unsatisfied demand for labour and horses, which has raised the wages of one and the price of the other to an unprecedented extent, so that it is not remarkable that the men who presented themselves for survey work should have been small in number and not up to the standard in former years.' These were the conditions I had found in June and they were now accentuated; no men were available except at their own terms, and a few days were necessarily lost before they could be secured. Returning to Athabaska Landing, I found it necessary to borrow two canoes from the Mounted Police to enable me to reach Moose portage where pack horses were waiting, and my camp was reached on the 27th. Work was resumed on August 28, and from that date until December 12, was carried on with great regularity, seventy miles being completed. I was now over fifty miles from my base of supplies at Wabiskaw, and the snow had become so deep that little feed was available for horses and their use could not be continued. Also by this date my surveying instruments required certain repairs. The six-inch Stanley transit (1906 pattern) in particular, needed specific attention to fit it for continuing the work. I decided therefore to pay off the native members of my party, and to employ the remainder, or white men, in cutting out a road ahead of the line to Wabiskaw river, and as far beyond as possible, bringing up all supplies and building substantial caches, while I would return to Edmonton with instruments needing repairs, and would ship in such further supplies as would be required to carry the line through to Peace river. This plan was carried out. I was detained at Edmonton much longer than I had anticipated, awaiting the return of my instruments, and when returning from Edmonton to Wabiskaw, between February 19 and March 6, I was laid up at Calling lake with pleurisy. Although not able to obtain any attention whatever during this painful illness, fortunately no complications occurred, and I was able on March 5 to go on to Wabiskaw, and later to my camp. I found on my return to my party, that no time had been lost. It had been found feasible to harness the largest of the pack horses as a four horse team and to haul from thirty to forty hundred pounds at a load, following the ice by way of Wabiskaw river to a point where the trail, cut out approximately in line with the meridian, intersected the river. Here

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a building had been prepared, sufficiently strong to resist any attempt of bears or wolverines to enter it, and at this point the cook made his headquarters, supplying the teamsters and the men cutting the road, with bread as they needed it. The distance by river and lake between this point and Wabiskaw was at least one hundred and fifty miles, and five trips, occupying ten days each, were required to bring on all supplies for the party and pressed hay and oats for the horses. My packer, who did the teaming, had to undergo much hardship, as he camped out wherever night found him, and he did this on fifty nights. From this cache on Wabiskaw river a trail was cut out thirty miles farther north to Burnt lake, where three Indian families live, and where I was able to lease a small house as a cache. This trail crossed a tract of *brulé* and windfall, and much chopping was required to make even a dog trail. Burnt lake lies in a chain of hills which seems to be a continuation westward of the Birch mountains, and on these hills snow fell to a depth of three feet, and much deeper in the hollows. In this region it was found impossible to use horses except with flat sleighs they were therefore harnessed to sleighs which had been provided, and two teams of dogs were also employed taking supplies in to Burnt lake. This routine, while apparently very easy and simple on paper, entailed much labour and hardship.

Between March 6 and April 5, all supplies had been distributed between Wabiskaw river and the Burnt lake cache, and on April 6 and 7, camp was moved to Corn lake, a few miles ahead of where the meridian had been left in December, viz. township 87. Work on the line was commenced again on April 8 and continued from day to day until Panny river was reached in township 96 on May 30, and another fifty miles had been added to the meridian.

At this date I received word that the *Stanley* transit was at Pelican portage, and the Hudson's Bay agent at Wabiskaw would not assume the responsibility of forwarding it to me through the hands of the Indians. As I was again getting too far from my base of supplies, I decided to go after the transit myself, while my assistant explored for a trail ahead to the Red river and moved on all supplies. On June 1 I left the camp for Wabiskaw, taking two Indians to do the canoeing up Wabiskaw river and from Wabiskaw lake to Pelican portage and return. One of my canoes had been left at Chipewyan portage during the winter, in anticipation of its being required. From my camp to this portage occupied three days, from the portage to Wabiskaw three and a half days. I remained two days at Wabiskaw preparing my mail, including progress report. Three days and a half were required to reach Pelican portage, where I arrived on the 13th. The 14th, being Sunday, I allowed my canoeemen a much needed rest, and on the 15th I started the return journey with the transit in my charge. Wabiskaw was reached on the 18th, but owing to a constant downpour of rain it was impossible to proceed until the 22nd. Wabiskaw river being now in flood, fast time was made back to Chipewyan portage, and my camp was found at Burnt lake, on the 27th.

During my absence, a trail had been cut through to the main Red river and all supplies moved up and stored in a well constructed building with spruce bark roof. The pack horses, however, I found in very poor condition from the attacks of mosquitoes and bulldog flies. My assistant had found it necessary to retreat to Burnt lake, where there was open feeding ground, after one horse had been actually killed by mosquito bites. The mosquitoes would rise out of the moss in black clouds and prevent the horses feeding at any time, night or day. There now appeared a slight lull in the storm of insects and a move was immediately made to the end of the meridian in township 96. Work was recommenced and continued without further interruption until the northeast corner of section 25, in township 107, was reached on October 21, at Manuche lake, which is within easy touch of the Hudson's Bay company's post at the confluence of the Red and Peace rivers.

Although my instructions were to carry the line to Peace river, it was now so late in the season that I knew that unless I brought my party out before the advent



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of deep snow, it would not be possible for us to come at all, chiefly on account of want of feed for the horses and we would practically become prisoners for the winter. Even if work could have been continued, our supplies were nearly exhausted and the Hudson's Bay company's posts along Peace river do not carry more than sufficient for their own needs. I was also influenced by the fact that the mounding between townships 88 and 96 had been omitted during the spring months, because of frozen ground, and I wished to complete it before the cold again set in. I therefore decided at this date to turn back, and my party was divided, my assistant taking the greater number of the men to do the mounding, while I remained behind with a few men, to observe for latitude. On November 14, the party was reassembled at the Hudson's Bay company's post at Wabiskaw. The horses were now harnessed to our sleighs and the winter road, by way of Calling lake, followed to Athabaska Landing. Poor sleighing and the need of horse shoes caused some delay, but the Landing was reached without mishap on the 24th, and my party paid off at Edmonton on the 30th. I returned to my home at Macleod on December 3.

Following is a description of the country between the Athabaska and Peace rivers, along the line of the 5th meridian, also of all matters observed in connection with climate, minerals, water, water-power, stone quarries, fish, animals and game:—

Between Moose portage on the Athabaska river and Moose lake occurs a strip of good land eight miles wide, suitable for settlement. This is bush country, as is all the country between the Athabaska and Peace rivers. Moose lake is one mile wide and fifteen miles long and whitefish are plentiful in its waters. Between Moose lake and Pelican mountain, a distance of fifteen miles, a flat tract of country extends east and west. At least fifty per cent of the whole area appears to be swamp land and drainage will be required to make it available for settlement. Pelican mountain is a continuation eastward of Martin mountain, and it is the watershed which separates the water flowing to Athabaska river on the south, and Peace river on the north. This so called mountain has no very prominent or rugged features and is composed of boulder clay, although boulders are little in evidence on the surface. The mountain is not worthless as it will eventually prove excellent for pastoral purposes. This elevation, however, presents serious obstruction to railway construction making the country to the north of it inaccessible, but a pass, or depression, cuts right through the hills immediately west of the meridian, which might be utilized. Excellent spruce timber formerly covered these hills, but fire has swept off quite ninety per cent of it; patches of good milling timber, however, still remain, and will furnish logs for portable mills for many years. The northern slope of Pelican mountain extends twelve miles, and being very gradual, conditions are favourable for agriculture. A southern exposure has generally been regarded as most favourable to the growth of plant life, but a preference for a northern exposure is now quite common in the western prairie provinces. The soil is chiefly loam, and the timber mixed. Willow river, crossing the north part of township 78, drains the north slope of Martin and Pelican mountains. It is a stream sixty feet wide and one foot deep at low water, and it is easily fordable, as the bottom is usually hard yellow sand. A strip of good land follows this river to Wabiskaw lake for a width of half a mile on either bank. After crossing the river, spruce swamp extends through township 79. Higher land lying west of Wabiskaw lake is then reached, where conditions suitable for agriculture are again found. I may here mention that the country surrounding Wabiskaw lake is immediately suitable for agriculture, although I cannot report how far back from the lake, but I would estimate an average of one mile. The soil throughout all this country is drift clay. The varieties of soil included under the term 'drift,' as far as compositions and properties are concerned, are innumerable, so I will only here state that I would judge the soil to contain from thirty to sixty per cent of sand, the smaller percentage giving clay loam and the greater loam, and these soils were found to merge from one into the other. Sandy loam seems to exist along the banks of streams such as Willow



river only; gravel and boulders are little in evidence on the surface. This country can be considered as particularly favourable for the class of settlers who have little or no capital to invest, other than their own labour, and at the same time offers attractions to many of all classes who never become reconciled to the great lone prairies. To the poor man the fish in the lakes and the moose in the woods will remove all fear of starvation; the forest will provide fuel, and when the forests have disappeared, coal will be available, lignite coal of good quality having been observed in township 78. The extensive swamp areas lying between Athabaska river and Wabiskaw lake make access to the latter point unfavourable during the summer months. These swamp lands exist owing to the lack of natural drainage or to the obstruction of the natural drainage lines, as moss, &c. I am inclined to favour the latter view. A feasible settlement road might be located from the Government road at the junction of Lesser Slave and Athabaska rivers to the west end of Moose lake, following the north shore of Moose lake to the fifth meridian, then swinging in a semicircle through northeast, north and northwest, until the meridian was again crossed at the foot of Pelican mountains, and across the mountains by way of the pass already referred to to the banks of Willow creek, and then following Willow creek to Wabiskaw lake. Such road would not only give access to Wabiskaw lake country, but would open up many good areas along its whole length. Wabiskaw lake, so far referred to, is the western of the two lakes of the name. Between these two lakes a large area of good hay land occurs, and following the chain of waters which forms the canoe route eastward to Pelican rapids on the Athabaska areas of meadow land are available on a large scale. Hay is an abundant crop throughout the country and is found along all creeks at points where beaver ponds have become meadows and around lakes lying west of Wabiskaw lake. Peavine is also common throughout the poplar bush land. From township 78 to township 82 my field notes show forty-four per cent as swamp land and not immediately available for settlement. It cannot be regarded as worthless, however, and defining it as muskeg, as is usual, is unfortunate, and will be referred to again. From township 83 to township 90 my field notes show twenty-five per cent as swamp land. The soil is of the same character as that in the Wabiskaw lake district, varying between loam and clay loam, but the country becomes more undulating and rolling. Townships 88 and 89 are apparently a continuation of Trout mountain, and I would not be surprised to learn that this elevation extends eastward to Grand rapids on the Athabaska, and if so, a trail or road could be constructed giving a short connection between Athabaska and Peace rivers. Forest fires have swept through all this country, and the large timber which formerly flourished has disappeared, with the exception of isolated clumps. The present condition of *brulé* and *windfall* give an appearance of great desolation, but comparatively little labour would be required to clear the land. In its present desolate condition it is the natural habitation of moose. Immediately along the banks of Wabiskaw river good soil prevails and very attractive locations for farms could be found along its whole length. Unfortunately this stream is not navigable for anything larger than a canoe, and the numerous rapids greatly impede travel even with a canoe. A road could easily be constructed along it. In township 81 Wabiskaw river is crossed. The valley has now become seventy-five feet deep and the pleasant lower banks of the upper stream have disappeared. From this river to township 92 the country is generally level, rising very gently towards the north; my notes show thirty-six per cent swamp for twelve miles. The soil is here more sandy than that met with farther south, but it is by no means barren. Much *brulé* and *windfall* is also widely distributed. With township 93 the country rises by successive steps and becomes hilly and appears to be a western extension of Birch mountain. Large areas have been almost entirely cleared by fire, and grass of the wild grain varieties, chiefly blue-joint, has taken root, and as it cures standing, affords considerable winter feed for cattle or horses. Lying one mile east of the meridian in township 95 is Burnt lake, which is the largest of a group of

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five lakes lying close together in the hills. A few Indians reside here, but no more are met with until the Peace river country is reached. Panny river, which is crossed in township 96, drains the northern slope of the Burnt lake country and is a tributary of Wabiskaw river. It occupies a valley one hundred feet deep and a mile and a quarter wide. From township 98 to township 101, a distance of twenty-four miles, the country is drained by Red river and its tributaries. This country can fairly be described as low and swampy and unfit at present for agriculture. The swamps are not muskegs, however, and clay is found under the moss. The field-notes show thirty-five per cent swamp and this percentage appears low. The meridian appears in this case to follow a series of ridges and a fair average cannot be obtained from the notes. Some particularly fine spruce follows the three branches of Red river, and these streams are suitable for conveying logs to Peace river. From township 102 to township 107, a distance of thirty-six miles, the country is drained by Birch river. The country commences to improve with township 102 and continues to improve as you travel north. A peculiar feature in township 102 is an area of two or three square miles covered with large tamarack, all of which is dead from no apparent cause. I have learned since that tamarack died in the same way in Lake of the Woods country in Manitoba and it is ascribed there to the work of an insect. This area is peculiar for the reason that the soil is jet black humus, with no sign of clay, sand or the fibre of peat. Under these dead tamarack, large alder and ferns flourish, also quantities of black currant shrubs and a shrub of a similar fruit, which my men decided was a cross between the gooseberry and the red currant. This is the watershed between the Red and Birch rivers. Water flowing to Birch river was first met with in township 103, and trails of Chipewyan Indian hunters from Athabaska lake appeared. An elbow of Birch river is crossed in township 104, and the river runs with the line to the north end of township 105, when it bends to the east. Good agricultural land is found along this river and along all the creeks flowing into it, but inland from the water courses, the spruce and moss swamps prevail. The creeks however, are numerous and even when small seem to favour the growth of poplar and birch. With township 106 large open meadows alternate with bush land of mixed timber. Hay becomes very abundant and meadows were observed which have the appearance of dried out muskegs. A long saline slough, sixty feet wide, occurs in section 25, township 106, and a river one hundred and twenty-five feet wide, in section 1, township 107, which shows a slight current; it is also saline. This river joins Birch river and is no doubt the Stinking creek shown on maps of the district. Both the salt water courses referred to have channels as regular as artificial canals, and their sources are no doubt salt springs situated west of the meridian. A large open meadow marsh and lake occurs in the north end of township 107, and is called by the Indians Manuche lake. This is the wintering range for Indian ponies. The meadow is between five and six miles long and one mile wide, and at least two-thirds of it is hay, while the bottom is smooth and ready for the mower. I would estimate the yield of hay at over 6,000 tons. This meadow had been burnt off previous to our arrival and the bush was still smouldering. A peculiar feature was noted in connection with this grass fire. It occurred on September 16 and burned besides the hay, roots and surface loam of four inches down to the clay soil, and yet on my arrival on October 1 new grass had attained a growth of four inches. Another peculiar feature of this fire was that while the ground appeared black on the surface, our feet turned up a bright vermilion powder, nearly as fine as wheat flour. This powder may have been the ash of the surface soil, but I must leave it to geologists to decide. I may observe that the clay used by Indians to construct their fire places also burns to vermilion. The chemical constituents giving this colour on burning have no detrimental effect on the growth of plants, as instanced by the growth of grass referred to above.

Before work was brought to a close for the season at Manuche lake, I made a trip across country to the Hudson's Bay Company's post at the mouth of Red river, which

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is situated about forty miles west of the meridian, and then up Peace river to Fort Vermilion. About half way between the meridian and Red river an entire change occurs in the appearance of the country. What I have so far described may be called moss country, as the ground, whether hill or dale, is covered with moss from a few inches to two feet in depth, according to locality. Now the moss is left behind and scrubby prairie is reached, similar in soil, grass, weeds and shrubs to many parts in the Saskatchewan valley. The only explanation of this change from moss to prairie which occurs to me, is the probably greater prevalence of fires during a long succession of years, in the area now covered with moss. The return of fire after fire would appear to have destroyed almost the last trace of organic matter, and this extensive region was moved back to the geological age when only lichen and moss covered the ground. That this country was once covered with a large forest of mixed timber there is sufficient evidence. The question now arises, did the removal of the timber and the organic matter in the top soil, leave behind barren clay? The rapid growth of grass at Manuche lake in cool autumn months, referred to above, would indicate that it did not. With the advent of a railway the more favoured prairie portions will be occupied, and later, settlement will spread out over and reclaim the moss country, and no such miracle will have been performed as the reclamation of swamp land in eastern Manitoba, between Beausejour and Whitemouth.

Before leaving this subject I may mention that the almost universal employment of the word 'muskeg' in the west, in connection with swampy ground of any nature, leads to much misconception, and is to be deprecated. The presence of moss and mosquitoes is to the average man sufficient evidence of muskeg. I am justified by indisputable facts, however, in stating that there is a comparatively small percentage of this north country which can be termed muskeg. Even the spruce swamps are found, in many cases, to have an undulating surface after a fire has passed over them, and I maintain that on the removal of the moss, good clay loam, or loam, with, occasionally, sand, will be found.

#### CLIMATE.

The summer of 1907 was spent in the Wabiskaw lake district. The early part of the summer must be regarded as unusual. An exceptionally cold winter with heavy snowfall was followed by a cool backward spring, and all vegetation was delayed from a month to six weeks later than usual. Similar conditions prevailed throughout Saskatchewan and Alberta. In July the thermometer registered between 70° and 80° during the day, and the nights were cool without being chilly, while rain fell on five days. August was of the same temperature, but the thermometer registered 28° on the night of the 10th and 29° on the night of the 11th. September was an agreeable month, with the exception of the 16th and 17th when snow and sleet fell to a depth of three inches, but no frost accompanied it, and it had entirely disappeared on the 18th. October was also a mild month until the 16th when two inches of ice formed on creeks and ponds, but canoes were used on Wabiskaw lake until the 22nd. November was bright and sunny, with only sufficient frost at night to keep ice firm. The first snow fell, to a depth of two inches, on the 2nd and about a foot on the 15th and 16th. The first part of December was very mild and rain fell on the 5th. Cold weather set in on the 14th and continued until the new year, when the lowest temperature was experienced, but nothing exceptional. The winter of 1907-8 may, as a whole, be regarded as mild and agreeable and as a fair average of the district. The spring of 1908 came on rapidly with the advent of April, and my horses commenced to feed along the banks of Wabiskaw river, in township 91, by May 1. May was a bright sunny month and brought on the vegetation in a wonderful manner, so much so that I saw hay already in stack at the outlet of Wabiskaw lake on June 7. It was wet in June, showers occurring almost daily. Between showers, however, there was bright sunshine and the foliage of trees and shrubs were at their best. Frost was reported by my assistant at

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Burnt lake on the night of the 27th, but there was none where I slept that night, five miles east of the camp. July was bright and pleasant and rain fell on five days. Two degrees of frost occurred on the night of the 30th. August proved a wet month, rain falling on nine days, otherwise the weather was bright and warm, no frost occurring during the month. September was bright and sunny; rain fell on six days and frost occurred on the night of the 6th. October continued bright and sunny and light rains only occurred on the 1st and 5th. Frost set in at night for good on the 18th; snow fell on the 27th and 30th, and on the night of the 31st the temperature fell to zero. November was clear and crisp with the temperature fluctuating between 10° and 20°. I reached Athabaska river on my way out on the 24th and found it still open in the centre. Following the above record of the weather through the growing and harvesting seasons of both 1907 and 1908, I see no reason why grain and root crops should not mature. Frost is to be expected in any forest country, and in the cases noted, were probably local and not general. As daylight continues practically throughout the entire growing season, and the temperature rarely falls below 50° during the night, I would say that conditions were peculiarly favourable to the rapid maturing of grain. My own personal knowledge of the climatic conditions which prevail throughout the different seasons in the prairie provinces has been gained during thirty years almost continuous residence, and I am therefore able to state, with some confidence in the correctness of my opinion, that the climate of the north country is quite as favourable, if not superior, to that of the prairie country, and it is in no respect inferior to the climate of the most favoured portions of Ontario. The fact of tomatoes ripening in an open field at Red river speaks for itself.

## MINERALS.

No time was at my disposal to prospect, but the following came under my notice. Tar sands occur on Wabiskaw river at Prairie river, which is incorrectly shown on maps as 'Pine' river. Float coal is found in the bed of Birch river and coal 'in situ' in township 78. The salt streams referred to indicate salt deposits, and sulphur springs occur between Manuche lake and Red river. Iron seems a constituent of all the soils and accounts to some extent for the dark red brown colour of the waters of the rivers. Birch river affords favourable means of prospecting over a large area, and it seems strange that this large river should be so little known, and its location on the map so incorrect. The present local Hudson's Bay Company's officers know of it only as Birch creek where certain Chipewyan Indians hunt.

## WATER.

The surface water in lakes and rivers is fresh and potable but is generally dark in colour. As no wells whatever have been sunk anywhere to any depth, I am unable to report on the supply available from that source. Springs are not numerous but such as were met with were pleasant to the taste.

## WATER-POWERS

No falls of any height occur on any of the smaller rivers, but numerous rapids occur on the Wabiskaw, Bear, Trout, Red and Birch rivers, and on smaller streams, which would probably give heads of from eight to ten feet. The Vermilion falls or 'chutes' of Peace river have often been described, and estimating roughly, I would say that they were about five times the horse-power of the Chaudiere falls at Ottawa. Grand rapids on Athabaska river did not come under my observation.

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## STONE QUARRIES.

No rock was observed 'in situ' until Peace river was reached, where the Devonian limestone becomes available. This formation, however, furnishes poor building material. Shale in exposure along the rivers is almost plastic.

## FISH.

Fish are abundant in all the northern lakes and form the staple food supply of the native population. The following species were observed, whitefish, jackfish, trout, dory, sucker and maria. The whitefish, however, is the chief fish asset, and they are caught in great numbers at Wabiskaw lake, Island lake and Calling lake, and a fish company is operating at the latter point. Trout are taken at Trout lake, but they are little relished by Indians as they are not to be compared with the whitefish as an article of diet.

## ANIMALS.

There is sufficient evidence to place it beyond doubt that buffalo once occupied a large portion, and perhaps the whole, of the vast territory between the Athabaska and Peace rivers. Their destruction is explained by the forest fires, which, by altering conditions of soil, have substituted moss and spruce for the mixed timber of poplar, birch, spruce and balsam, and the many succulent plants and shrubs on which the buffalo subsisted. There is now no reliable information to be obtained from the present native inhabitants as they all seem to be of French extraction and Indian traditions have been lost, but the comparatively sparse original Indian population could have made but little impression on the herds which once roamed this country, wasteful as they are of animal life.

Moose inhabit the country in great numbers. Judging by their tracks and allowing for the numerous tracks made by one animal, it would be a conservative estimate to say that there was one animal to every ten square miles. During the exceptional winter of 1906-7, when the Government was called upon to assist the starving Indians at Wabiskaw and other points, individual hunters killed from ten to fifty of these animals.

Caribou are not so numerous, but are occasionally found, and a small herd was seen by members of my party in the Pelican mountains and two of these animals were killed north of the Wabiskaw.

Fur bearing animals were very scarce during the winter of 1907-8, and I understand that the fur catch is even smaller for the present winter.

Wolves, which have been reported numerous, were not seen by any members of my party and I doubt their existence in anything like packs.

The beaver, which have been protected by the Government for the past few years, have begun to leave their holes along the banks of the rivers and to work their way up the creeks to their natural habitation, and where no doubt gestation and caring for their young can be followed in peace. Numerous cases came under my notice where they have constructed dams and lodges in readiness for the coming winter, and on my arrival at Edmonton, I was very much disappointed to learn that Indians were to be allowed to take them this winter, under the plea of starvation. How senseless this plea is, the reference to moose above made would alone prove, and their neglect to store fish for their own use, as well as for their dogs, and also their neglect to plant potatoes are other good reasons showing that they deserve no assistance whatever, and it is a great pity to risk the extermination of these animals. Beaver should be regarded as a valuable asset, and placed under the direct care of the Government, even if it were necessary to appoint special guardians to see that regulations with regard

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to taking them were strictly observed. Under the regulations until lately in force, which protected them to a certain extent, many were killed for food and I have no doubt the pelts reached a market by underground routes.

## GAME.

Water-fowl were very numerous and along Wabiskaw river a collection could soon have been made of the fancy plumage varieties. The teal duck seems to favour the Pelican canoe route. Partridges were very scarce until the Red river country was reached, when both the ordinary and the spruce varieties became plentiful. Prairie-chicken were first seen in township 100, and they became more numerous as we approached Peace river.

In extenuation of the unusual length of this report, I would say that in view of the attention now being given to this north country and of your instructions to me, I have endeavoured to give all the information in my power.

I have the honour to be, sir,

Your obedient servant,

A. W. PONTON, D.L.S.

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## APPENDIX No. 37.

## REPORT OF W. R. REILLY, D.L.S.

## RESURVEY AND RETRACEMENT IN NORTHEASTERN SASKATCHEWAN

REGINA, SASK., February 8, 1909.

E. DEVILLE, Esq., LL.D  
Surveyor General,  
Ottawa.

SIR,—I have the honour, in accordance with your instructions, dated March 28, 1908, to make the following general report of my season's work, which included retracements, resurveys and miscellaneous surveys in the Prince Albert district.

Instructions were to use the same transport that I had the previous season. This outfit was in the charge of Mr. Charles Hayes, on Saskatchewan river north of Lloydminster.

I was fortunate enough in securing at Saskatoon two of my old hands that were used to handling the outfit. These I sent from Saskatoon on May 5 to take the transport to Prince Albert, where I was to make up my party.

On Friday, May 15, I received a message from these men stating that they had reached Prince Albert with the transport.

On Monday, May 18, I left Regina for Prince Albert, where I met Mr. L. B. Kingston, my assistant, whom I had instructed to be in Prince Albert on May 15.

On Tuesday I organized my party and on Wednesday I left Prince Albert for township 49, range 23, west of the second meridian, taking the old trail to the forks, which was in fair condition with the exception of a few soft holes.

My instructions, dated April 25, were to make a retracement of that part of township 49, range 23, lying north of the river, and to report as to the necessity of a resurvey of the south part of the township; I immediately went over to the south part and reported that a retracement was needed. I forwarded you a petition signed by all the settlers that could be found, asking for such retracement and subsequently received your instructions to make it.

I completed the retracement north of the river on June 9, and on the 10th I ran the west boundary of the township on a straight line south to the township corner feeling sure that it would strike west of the township corner, which it did, showing a bend in the outline. It rained steadily the two following days, and on the 13th I moved into township 49, range 22, and subsequently from there into township 49, range 21.

After receiving your instructions, dated June 26, to complete the retracement of township 49, range 23, I returned from township 21 to this township on July 25, and finished the survey on August 17, with the exception of some traverse work.

Saskatchewan river runs through the township from the northwest corner of section 18 to the southeast corner of section 36. It has a number of large bends. Its banks are broken and vary from twenty to one hundred feet high alternating from one bank to the other. Generally where it is high on one side it is low on the other. The current is swift in high water with no rapids of any account. In low water several strong rapids are formed.



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The country north of the river gradually rises to the north to a height of about two hundred feet above the river. The surface is rolling slopes, flats and steeps with a heavy growth of poplar in most places, the heaviest being on the west side of the township. A few scrubby openings occur on sections 35 and 36. Many large patches of swampy ground are found dotted with clumps of willow.

Garden river meanders from the northwest corner of section 32 through sections 32 and 29 and into the Saskatchewan on the east side of section 20. It is from thirty to forty feet wide, one to four feet deep and has a rapid current. Some clumps of spruce are found along the banks near the mouth.

With the exception of a short distance from the Saskatchewan which is broken the most of the country is but slightly rolling and generally flat along the south part of the township.

A number of fresh water sloughs are scattered over the township. They are more numerous in the southeast quarter of the township.

Two large lakes were traversed; one cuts sections 15, 10 and 11, the other one is in sections 11 and 12.

An old surveyed trail from Prince Albert to the river forks passes through the township from section 18 to section 24. It is being abandoned in places where roads along section lines are being made to take its place.

The greater part of the south half of section 18, sections 7 and 8 and a part of sections 8 and 5 has been covered with a heavy growth of thrifty jackpine, a great quantity of it being large enough for railway ties. This ground has been pretty well run over and a great amount of building and other material taken off. Heavy bluffs of poplar are found on most sections, this being a poplar bluff country with large scrubby openings.

The homesteads south of the Saskatchewan are pretty well taken up.

A couple of farms on odd sections are being worked, but generally speaking the country has a backward appearance.

Away from the jackpine ridges the soil is good. Hay and water are plentiful and fuel and building material are seen in large quantities. A small spring creek with excellent water runs through section 18. Another creek known as Steep creek runs through sections 15 and 22.

This is a good mixed farming district and an excellent cattle and hog country. Steep Creek post-office is on the southwest quarter of section 24.

I moved into township 49, range 22, on June 13. My instructions of June 6 were to make a retracement of that part of this township lying north of the river. The south part had been retraced in 1893, and the north boundary recently.

Saskatchewan river enters the township on the west, at the southwest corner of section 31. It flows in a very zigzag course across the township, being joined on the southwest quarter of section 24 by its south branch. The banks are much the same as in range 23. The stream is much swifter being virtually a succession of rapids from the west boundary to the forks.

A ferry was being put in by the Saskatchewan government a few chains east of the west boundary.

Very high water prevailed during the time of survey, which made crossing tedious. Very few original markings were found north of the river. I ran all lines south and connected with monuments south of the river.

The country slopes back from the river to a height of about two hundred feet.

Section 31 is rolling in the north with long slopes in the south, to the river. It is the only part north of the river that can be said to be fit for cultivation.

From section 31 to section 36 along the north boundary are large spruce and tamarack swamps or muskegs with intervening jackpine ridges. Small swamps and jackpine ridges with patches of poplar cover the remainder of the township.

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The river valley is formed by ranges of hills that stretch from bend to bend. Between the bends are large flats which are covered with poplar and willow.

In the flats in sections 26 and 27 are two crescent shaped swamps that are apparently old beds of the river.

A heavy belt of poplar six to twelve inches in diameter covers the ground between these swamps and a large amount of young poplar covers the flats and slopes in sections 22, 23 and 24. The only prairie openings are on section 31. Poplar, jackpine, tamarack, willow and other scrub cover the ground.

A large amount of poplar is large enough for building and other purposes. A good deal of jackpine is scrubby. It is not very extensive in any place, but by going over the whole area a large amount of railway ties could be made.

No minerals or stone quarries were found.

Game was scarce, some traces of mink, foxes, coyotes, etc., were noticed and frequent tracks of jumping deer were seen.

Many points on the river were good places for the erection of a dam and developing water-power. An extensive power could be obtained.

There does not appear to be any use for such power on the ground, and only such a scheme as would transmit the power to a distance is likely at any time to receive consideration.

I completed the survey of the township on Friday, July 3. On the following day it rained, which prevented moving.

On Monday I started for township 49, range 21, which is below the south branch of the river. To cross this branch I had to make a very roundabout trip to Mitchell's ferry, in township 48, range 23, thence by the old Fort a la Corne trail until we struck the old Fort a la Corne trail to the river forks.

The trails on account of frequent heavy rains were in many places almost impassable; we had to cut trails around impassable spots, fill many places with brush, etc., and it took three days from starting to get camped, on July 8, in township 49, range 21. My instructions dated June 6 were to make a retracement of that part of the township lying north of the river, and report as to the necessity of a resurvey south of the river.

I reported progress of the work and continued running lines until July 22 when I received your instructions dated June 26 to complete the retracement of township 49, range 23.

Awaiting your further instructions about township 49, range 21, I deemed it advisable to return to township 49, range 23 and complete the retracement of that township as hereinbefore described which I completed on August 17.

After completing township 49, range 23, I started eastward again intending to return to township 49, range 21, if I did not receive further instructions.

On the road I received your instructions dated August 13, stating that the work on township 49, range 21, was not to interfere with the work advertised under the Dominion Lands Act.

I, therefore, went into township 46, range 22 to make a retracement of that township according to your instructions dated June 29 and got camped there on August 21.

Not much difficulty was found in the retracement of this township. A large number of the old markings were found and where new monuments were placed to define the corners not marked, they did not interfere much with the supposed boundaries or make many changes in improvements.

On the north boundary of section 21 a part of the old quarter section post was found 2.30 chains west of the centre of the section. I could not find the bottom of the post nor any traces of the bearing trees. The point was not satisfactory to me and the owner of the northeast quarter of the section was perfectly satisfied to have it placed in a proper position. As no one could give any information about it, I therefore placed it midway between the section corners.

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This township is rolling or undulating, slightly broken along the north by Peonan creek, in the southwest by a succession of lakes and sloughs and in the east by large irregular lakes.

The creek contains excellent water and does not dry up in the summer. The water of the lakes and sloughs is slightly alkaline in nearly every place.

A considerable portion of the ground is covered with willow and poplar bluffs, the poplar in all cases being large enough for fence rails and the willow for fence pickets. In the east and northwest parts of the township there is a quantity of poplar large enough for building purposes.

The soil is a loam of good quality and produces good crops of wheat, oats, barley, &c., and excellent roots and other vegetables. On the high ground not much damage was done by frost, but low places suffered considerably.

The district is best adapted for stock raising, which is followed to a considerable extent, and dairying is receiving more attention every year. A quantity of cream is now shipped by the different farmers to the creamery at Birch hills.

Hay can be cut around nearly all the sloughs scattered throughout the township. There is a large quantity available in the southwest and eastern portions. There is no water-power available in the township. No minerals of economic value were met with. Ducks are numerous, prairie-chickens are plentiful, while geese and sand-hill cranes are scarce. Coyotes, skunks, gophers and other fur bearing animals were seldom seen. Very little of the land on odd sections has been cultivated.

The most of the settlers in this township are Scandinavians from the northwestern United States, who appear to be very prosperous. They have made permanent improvements, and in a short time will have excellent farms. A considerable amount of road improvements has been made. The road on the east side of sections 29 and 32 and on the north of sections 21 and 22 has been graded and a number of other improvements done. The Canadian Northern railway cuts the township from section 31 to section 22. Farm trails run in many directions and were in good condition. The lines and mounding were finished on September 3.

After the completion of township 46, range 22, I moved into township 46, range 21, to make a retracement of that township according to your instructions, dated June 26. This township is very much like township 46, range 22. The land is rolling, with bluffs of poplar and willow, with open patches and sloughs intervening between the bluffs. The only continuous bush occurs in the southwest corner of the township. The trees in all cases are large enough for fencing purposes, and on every section there is poplar of a size suitable for building purposes. The soil is a sandy loam of good quality, with a subsoil of clay and, where cultivated, appears to have raised good grain crops and excellent roots and other vegetables. The most of the grain was cut in time to escape much damage by the frost this year, but last year, as in many other districts, it was badly damaged. The whole township is much broken by sloughs and lakes. A large body of water occurs in section 30, with a good deal of swamp about it, another with good shores in section 21, and a very much broken and irregular one in sections 35 and 36. A large lake containing small scattered islands breaks the east boundary of section 36, and another surrounded by small hills takes up a good portion of the northeast quarter of section 24. The strip on the east side of the township, consisting of sections 1, 12 and 13, is very much broken by sloughs. None of these bodies of water appear to have outlets, and most of them are alkaline to some extent, but not enough to make the water unfit for stock. Carrot river contains good water. It flows northerly in a narrow valley through a very crooked channel from twenty to twenty-five feet wide and three to four feet deep, skirting the east boundaries of sections 22, 27 and 34. Practically all the sloughs are surrounded by strips of good hay land. There are no very large single areas in any one place. Upland hay is also good. The district is well adapted for mixed farming, and is an excellent cattle and dairying country. No water-power of practical use is available other than a small power that could be

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developed on Carrot river by flooding a considerable area of land. It would not be permanent and of no use in winter. No minerals of economic value were seen. Game, exclusive of ducks, is not plentiful, but there are a few prairie-chickens and rabbits. Geese and sand-hill cranes were entirely absent. Coyotes, skunks and badgers were fairly plentiful. Most of the even sections are occupied, mainly by Scandinavians from Europe and the northwestern United States. They are making good progress, and bid fair to make splendid farmers. The original survey had been well done. I found the most of the original markings, and I made no changes of any extent from supposed corners in placing posts to mark undefined corners.

A graded road made by the Saskatchewan government runs along the east boundaries of sections 19, 30 and 31. This road extends north across Peonan creek in the north township and south to the village of Kinistino.

Following your instructions, dated June 26, I ran the north boundaries of sections 35 and 36 and the east boundary of section 35, township 45, range 21, on September 19, removing temporary posts planted by Mr. Hubbell in 1905 and erecting monuments at the northeast corner of section 35, at the quarters on the north boundaries of sections 35 and 36 and the east boundary of section 35. None of the original monuments at these corners could be located.

On September 21 I moved into township 44, range 22, to complete the retracement of that township according to your instructions, dated September 4. I followed the trail on the left side of the river passing near the village of Kinistino on the southeast quarter of section 29, township 45, range 21. Crossing Carrot river on a bridge on a graded road on the east boundary of section 7 in this township, we travelled across section 6 to the east boundary of range 22 and south into township 44, range 22. In this township I retraced the two interior meridians between the centre of the township and the west boundary, the north boundary of sections 7, 8, 9, 19, 20, 21 and 24, the east boundaries of sections 23, 26, 35, 25, 24 and 36, and traversed six lakes.

Speaking generally of this district, it is a rolling poplar bluff country with large prairie openings and many sloughs and lakes. It presents special advantages for raising grain, cattle, horses, hogs and poultry and for dairying. It has natural advantages in being well watered, good soil, with an abundance of hay and a fair supply of fencing and rough building material. A number of settlers have taken up homesteads. They are making good progress, and are apparently doing well. The Saskatchewan government has done this season a considerable amount of grading on a road on the east boundaries of sections 15 and 22 and extending into section 26. According to instructions, dated June 26, I erected monuments to more clearly define the southwest corner of township 45, range 21.

From township 44, range 22, I moved into township 47A, range 24, on October 9, to make a retracement of that township and township 47A, range 25, according to instructions dated September 4. I returned by the same route around the east end of Waterhen lake until I struck the road running westward from Kinistino to Birch hills, on the south side of the Canadian Northern railway. From Birch hills a road allowance running north, on which improvements have been made, leads into township 47A, range 24, and an Indian reserve cuts the township, making sections 18, 17, 16, 15, 22, 23, 26 and 35 fractional.

The original survey of this township was not satisfactory. In 1890, Mr. J. L. Reid, D. L. S., made a partial resurvey and my instructions were to retrace Mr. Reid's survey where it was found to be satisfactory. As I proceeded with the survey it appeared to be satisfactory to restore Mr. Reid's survey with the exception of the east boundary of section 4. The particulars of this boundary were reported to you from time to time, and I received instructions not to make a survey affecting this boundary. Some correspondence took place in reference to the position of Indian monuments defining the north boundaries of sections 16, 17 and 18. Finally the mounds on these boundaries were adjusted from the Indian monuments in accordance with your

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instructions, but it appeared from further search that you have no record of an Indian monument being placed on the north boundary of section 18 where it was found by me. Before leaving the field I received instructions to return to this boundary, but I reported that weather conditions were such that the trip would be futile. You still have this matter under consideration. I retraced the outlines, interior meridians, and cross lines in this township, passing over the east boundary of section 4, and south boundaries of sections 3 and 4, and erected a mound as on a correction line, on Reid's meridian at the southeast corner of section 9. I traversed Saskatchewan river forming the west boundary of section 7 and a lake cutting sections 10 and 11. The surface is rolling in the southwest quarter and slightly rolling in the southeast quarter of the township. It is comparatively level in sections 24, 25 and 36 and along the Indian boundary. Many fresh water sloughs of small extent dot the south part of the township. In the north they are more numerous and larger, covering a considerable part of the surface. A large marsh extends across section 3 into the north part of section 4. A drain has been dug in this marsh through section 4 into section 5 following a small creek running through section 6. Large prairie openings occur in the south part of the township and a few small scrubby openings in the north. Poplar with willow, alder and hazel bush cover the greater part of the surface. Clumps and belts of poplar with timber large enough for rough building, fencing and fuel, are found on every section. Hay of good quality is fairly plentiful in the tier of sections along the south boundary. A large quantity can be cut from many sloughs in all parts of the township. The soil is a good quality of loam and will produce good grain and root crops. Throughout the township the ground is much broken with sloughs, which impair its value for farming purposes. On the other hand the close proximity of a railway station enhances its value to a large extent. A number of homesteads have been taken up recently and a fair start made at farming, which promises well. A few older settlers on the south part of the township have large improvements made.

While camped in township 47A, range 24, I retraced the south and east boundaries of fractional township 47A, range 25. It consists of a part of section 1, and the southeast corner of section 12. I traversed South Saskatchewan river forming the west boundary of this township. The river bank is heavily wooded with poplar of small size and a heavy growth of willow, poplar and alder underbrush. The bank extends back from the water about ten chains, in gentle slopes, and rises to a height of about one hundred feet. A small creek in a deep ravine with high sloping wooded banks runs through the south half of section 1. South of the creek the land is mostly rolling prairie with scattered bluffs of poplar and clumps of willow and poplar brush. North of the creek the ground is rolling and heavily wooded with poplar and a heavy growth of poplar, willow, alder and hazel underbrush. There are some large patches of young growing poplar six to ten inches in diameter. Scattered trees of large dimensions are found all over the area. The soil is a rich black loam on a clay subsoil. There are some odd fresh water sloughs in the south part of the township, some of which will produce a small quantity of good hay. While in township 47A, range 24, I received instructions to investigate a report that the quarter section monument on the north boundary of section 32, township 46, range 24, was lost. I had very little trouble in locating this corner which was a wooden post under water in a slough. I renewed it with a long poplar post which shows well above water. During the season a large amount of traverse work was not done, which was considered advisable to leave until it could be done on ice.

Apart from townships which I retraced, I received instructions to do traverse work in township 45, range 21, township 46, range 23 and township 42, range 27. These were townships in which retracements were recently made.

By November 12, I had completed all work in township 47A, range 24, and vicinity. Water areas had now frozen over and I was able to do traverse work rapidly. I

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determined to do all the work in the least time, and accordingly moved into township 46, range 23, and completed the lakes in that township. I had instructions to make a survey on the east side of this township, to connect township 45, range 22, first system, with township 46, range 23, third system, which I did.

From township 46, range 23, I moved in succession into township 46, range 22, township 44, range 22, township 45, range 21, and township 46, range 21, completing all traverse work in these townships on November 23. A heavy snowstorm set in the following day, obliging me to change my rigs from wheels to runners before moving camp. This I readily performed by making temporary plank runners on which I placed the democrat boxes. I was unable to procure shoe iron until I reached Fort a la Corne. The running gears I shipped by freight from Kinistino to Prince Albert, where they are stored with the other transport goods. From this camp I moved into township 49, range 21, to make a new survey of that township. I was working in that township when I received your instructions to disband my party. I worked three days after receiving your instructions, doing work I considered necessary, to leave what I had done in proper shape to be completed at another time.

On December 21 I started for Prince Albert for the purpose of traversing two lakes in township 49, range 23, on the way. These I completed, and on December 24 I arrived at Prince Albert and paid off my men. On the 26th I made an agreement with Mr. James Bayliss, Lost River postoffice, for wintering the horses, while the transport goods were stored with Messrs. Fowle and Sutherland, Prince Albert.

On December 28 I went by train to Rosthern and drove to St. Julien for the purpose of traversing lakes in township 42, range 27, west of the second meridian. A few hours after arriving at St. Julien a blizzard started, followed by intense cold weather, which lasted two weeks. I found it impossible to do the work, and after being stormed in for a couple of days it was with some difficulty I got back to Rosthern to catch the train on which I got home to Regina on January 1, 1909. I returned to Rosthern on January 26, and from there I made a successful trip to St. Julien, completed the traverse work in township 42, range 27, and got home to Regina January 29, 1909.

My season's work did not extend over a large enough tract of country to cause any marked difference in climatic conditions. The whole district presents much the same general features. It is a wooded country with many prairie openings, while patches of swamp and small lakes and ponds are found in every direction. Saskatchewan river is joined on the east boundary of range 22 by its south branch. Both are large streams. Saskatchewan river forms part of the waterway from Winnipeg to Edmonton, on which in former years a summer service was maintained. It is still navigated to some extent as far up as Prince Albert.

The temperature of the seasons in the north country does not differ materially from that of the prairie plains to the south. In each district spring comes about the same time, early in April. In the north snow lasts a little longer in the spring, falls a little earlier in autumn and to a greater depth in the winter. It is not unusual to have good sleighing in Prince Albert district when there is bare ground on the plains to the south.

In a range of years over the whole country marked differences in weather conditions have prevailed for the same season in different years. In the north country the wooded growths and the many water areas are no doubt the causes of more frequent rains than the prairie country is favoured with.

Experience is teaching different methods of farming in this country, so that unfavourable climatic conditions are being largely overcome. The man that puts energy and intelligence into his work is assured of a measure of success under unfavourable conditions and when favourable conditions prevail, he reaps a rich reward.



## SESSIONAL PAPER No. 25b

To the settler of means who can farm on a large scale perhaps the prairie country offers the most likely opportunity of large gain. The north country offers special inducements to start farming with small means. A man has the advantage of good buildings for little more than the labour, wood for the chopping, and an opportunity of winter work in the woods if he so desires.

I have the honour to be, sir,

Your obedient servant,

WM. R REILLY, D.L.S.



## APPENDIX No. 38.

## REPORT OF E. W. ROBINSON, D.L.S.

SURVEYS IN THE RAILWAY BELT NEAR SHUSWAP LAKE.

OTTAWA, February 13, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General  
Ottawa.

SIR,—I have the honour to report that in accordance with your instructions I left Ottawa on April 18, 1908, proceeded to Kamloops, B.C., and consulted with Messrs. J. E. Ross, D.L.S., and T. H. Plunkett, D.L.S., as to the division of surveys projected in the Kamloops district. After discussion it was decided that Mr. J. E. Ross should undertake the work in the neighbourhood of Kamloops, Mr. T. H. Plunkett from Golden westerly, and that I should work from Sicamous Junction easterly.

I accordingly organized my party at Kamloops and on May 1 moved to Sicamous Junction. I proceeded from there about four miles northeasterly along the valley of Eagle river, camped in section 17, township 22, range 7, west of the sixth meridian, and completed the surveys in this township.

Eagle river valley, having an elevation of about 1,200 feet above sea-level, runs approximately in a northeasterly and southwesterly direction and has an average width in the township of from forty to sixty chains. Eagle river empties into Shuswap lake near Sicamous Junction; it averages about two and one-half chains wide and the current in high water runs about four miles per hour. There are rapids and sandbars in places making the river generally unnavigable although it is possible in low water to pole up in a canoe.

The soil in the valley bottom is sandy loam about twelve inches deep overlying a sandy clay subsoil. Samples of both the soil and subsoil have been analyzed and the report states that they are both excellent. Sloughs and marshes occur all through the valley. These when drained could be used as hay meadows. The sidehills bordering the bottom land are usually too steep and rocky to admit of successful cultivation but benches can be found here and there that could be utilized. The soil on these benches is usually richer than the bottom lands.

This valley seems well adapted for fruit growing and mixed farming; no summer frosts were experienced and the land being well watered and out of the 'dry belt,' no irrigation should be necessary. A fire having run down the valley some years ago very little large timber is left; an occasional strip of cedar, hemlock, fir and pine is found while the remainder is covered with second growth of the above varieties with poplar, birch and willow along the river banks.

Leaving the valley on June 18, I proceeded by gasoline launch and boats to the north shore of the main Shuswap lake pitching camp near the mouth of Manson creek in section 14, township 23, range 10. I was instructed to connect Block II of timber berth No. 240 to the township surveys. Considerable difficulty was experienced in locating this block, as it had been logged, of which I had not been informed, and fire had subsequently run over it. The soil through the southern portion of this township varies from a rich black muck with clay subsoil to a sandy loam with gravel subsoil. There is an excellent bench from one-half mile to one mile in width lying

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about one-half mile from the shore. Several settlers have taken up homesteads here and although none of them have very much land under cultivation, their efforts so far have been crowned with success. Standard fruits and strawberries seem to do especially well, and in view of the results obtained here and in other sections of the Shuswap lake district where fruit growing has been practiced for a considerable number of years, I am of the opinion that Shuswap lake will prove to be one of the best fruit growing sections of British Columbia.

Leaving here on June 26, I returned to Sicamous Junction and from there went about two miles east to the south side of Eagle river where I commenced the survey of timber berth No. 528, Block V. This berth takes in the greater portion of the valley of Owlhead creek, a tributary of Eagle river, and extends southerly up the mountain side reaching to Cariboo plateau.

The valley of Owlhead creek is well timbered with cedar, hemlock, Douglas fir and white pine. Another belt of good timber is found about one mile west of the northwesterly corner of the limit, and consists of hemlock, cedar and Douglas fir. The interior of the limit is largely second growth with occasional large trees of fir and tamarack. There is also some good cedar, hemlock, fir and pine lying to the north of the northerly boundary of the berth and principally in the following sections: northeast quarter of section 4, southeast quarter of section 9, south half and northeast quarter of section 10, northwest quarter of section 11, and northwest quarter of section 12, all in township 22, range 7.

The only land having any agricultural value lies along the valley of Owlhead creek. The soil consists of eighteen to twenty-four inches of rich black muck with a subsoil of gravelly clay. A small quantity of slough hay could be cut in the beaver meadows at the head of the two branches of this creek. Approximately fifty acres in all could be used, although this would necessitate some improvements in the way of drainage and clearing.

On September 30, I moved to Malakwa, B.C., and started work in township 23, range 6, adding on sections to the existing surveys. Fire has run through the valley destroying most of the timber, consequently the clearing of the land would be comparatively easy. The soil is a sandy loam with considerable surface rock. The sidehills bordering the valley are covered with second growth fir, cedar, spruce and pine with poplar and willow in places. They are usually too steep to admit of profitable cultivation, although small benches exist which might be utilized, the soil usually being a rich loam. Summer frosts occur occasionally but as a rule are not very severe, and these would probably disappear when all the adjacent land is under cultivation. Mr. Wolsey, the postmaster, a resident here for about twelve years, states that he has never had a failure with his strawberry crop. The land seems best adapted for mixed farming, Revelstoke providing an excellent market for all produce.

On October 19, I moved to Craigellachie, which lies in the east part of township 23, range 6, and commenced the surveys there.

The valley of Eagle river in this district is from forty to seventy chains wide, narrowing down to a few chains at the confluence of the north fork and the main stream. Fire has run over a portion of the valley, but leaving generally a strip of good timber, consisting of cedar, spruce, hemlock and fir along the river bank. Over the burnt area poplar, birch, alder and willow is now growing. The soil is a rich sandy loam from nine to twelve inches in depth, overlying a sandy clay subsoil. The land is marshy in places, caused largely by beaver dams, but any portion could be easily drained, there being a gentle fall to Eagle river. The river apparently overflows its banks at extremely high water. The land appears to be well adapted for mixed farming; dairying in particular should be very successful as the rainfall seems to be large and consequently good pasturage could be maintained. We repeatedly had heavy rain showers, during which three or four miles down the valley no rain fell. The sidehills on the north side of the valley are steep and sparsely covered

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with small cedar, fir, poplar and willow. The soil is a light sandy loam with a large amount of surface rock and apparently of little value for agriculture. Over the side-hills, on the south side of the valley a severe fire has run in some places almost sweeping the land clean. Portions of this could be used for agricultural purposes as the slope is not excessive and some good level benches exist.

On November 30, I moved to Griffin lake, in township 23, range 4, to traverse Eagle river, across sections 19 and 20.

The valley here is narrow and has been fire swept. Small second growth poplar and birch have commenced to cover the land. The soil is a sandy loam and very rocky. Summer frosts are reported to be prevalent. The land would make fair pasturage and dairying might be successful. A good market for any produce would be the lumber camps and sawmill on Three Valley lake, about three miles distant.

On December 4, I moved to Revelstoke, and from there about three miles down Columbia river, camping on the west side of the river. I traversed the west bank of the Columbia, in township 23, range 2, together with the islands in the river, but was unable to complete all the work outlined in this township, owing to inclement weather and the depth of snow.

The land on the west side of Columbia river is rolling with a modern slope from the river back to the foot of the mountains.

Most of it is well timbered with cedar, spruce, hemlock and pine, although in places fire has run over it some years ago, and this portion is now covered with dense second growth of the foregoing varieties, consequently the clearing of the land would entail considerable expense. The soil is a sandy loam with some surface rock showing as one approaches the base of the mountain.

The country seems adapted for mixed farming and Revelstoke, a divisional point on the main line of the Canadian Pacific railway, would prove an excellent market for all produce.

The valley of Columbia river, south of Revelstoke, will no doubt eventually be a thriving agricultural country, as there is a considerable quantity of good land on both the east and west sides of the river.

At present access to Revelstoke by road from the west side of the Columbia is impossible. A wagon bridge, however, under project to cross the river at Revelstoke and then with a wagon road down the west side of the Columbia, this objection will be overcome.

I closed the season's operations on December 30, moving into Revelstoke that day. On December 31, I proceeded to Kamloops and stored my outfit, and on January 2, 1909, left Kamloops for Ottawa.

I have the honour to be, sir,  
Your obedient servant

ERNEST W. ROBINSON, D.L.S.

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## APPENDIX No. 39.

## REPORT OF JOS. E. ROSS, D.L.S.

## SURVEYS IN THE RAILWAY BELT, KAMLOOPS DISTRICT.

KAMLOOPS, B.C., February 21, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR.— I have the honour to submit the following general report on my survey operations in the railway belt, British Columbia, during the season of 1908, which were confined to the westerly or 'dry belt,' portion of the Kamloops district, extending from Lytton station on the west to Shuswap station on the east.

I began the season's work on March 9, a few days after I had completed my returns of the previous season, as I had instructions from you stating that as the new plans for several townships to the south of Kamloops could not be issued owing to discrepancies between the old and new surveys it would be necessary for me to investigate the matter as soon as possible and forward the results to the Department.

After finishing this work and making some subdivisions in the same neighbourhood I made arrangements with the other two parties in the district by which I was to continue the work westerly while they would take up the work in the easterly portion.

But I had only got well started in this direction when I received instructions from you to go back and make corrections of some mistakes in the old surveys in the townships on the north side of Kamloops lake. These mistakes had been found by myself in 1906 and more fully investigated and confirmed by the late Mr. Stacey in 1907. The corners had to be shifted and new lines run.

On finishing this work and a few additional small surveys in the vicinity I decided to work westerly so as to lose as little time as possible in moving back and forth.

I might mention here, to show how the general work of the season was interrupted by the resurvey of old surveys, that before the end of the season I was again instructed by you to make further investigations of discrepancies in the neighbourhood of Campbell lake. This was a continuation of my first work of the season.

These resurveys are not without their unpleasant features. To begin with, doing work a second time always has a dispiriting effect. A cause of much vexation is the difficulty in picking up the old line in a hilly country. Usually the new line is just far enough from the old one to give what appears to be a lot of extra work. To avoid this one has to resort to offsetting which involves calculations, simple in themselves, but conducive to mistakes. An annoying obstacle met with in the woods here is the barbed wire fence on the boundaries of grazing leases. It is almost impossible to fell the trees without destroying the fence. It is a relief, therefore, to know that all the discrepancies in the old surveys so far as known have been eliminated.

In proceeding westerly from Kamloops lake I made surveys at nearly all the railway stations from Savonas to Lytton.

On finishing the surveys to the west of Kamloops, I made several small surveys in the North Thompson valley. One of these surveys had been a long standing one on the list as I had not been able to make it before, although I had attempted to do so several times. A resurvey of lot 338 was necessary in order to obtain the areas of

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adjoining quarter sections and this is where the difficulty came in. All the corners and boundary marks had been lost as well as the notes of the original survey. It was only through an arrangement between the agent of Dominion lands and the owner that the survey was made possible. The latter agreed to relinquish his claims on the lot and to accept instead the same area as nearly as possible described in sections and fractions thereof in accordance with the Dominion survey system.

On completing the surveys on the North Thompson I resumed the work to the east of Kamloops and continued easterly for the rest of the season, reaching as far as Shuswap.

On account of the similarity of the whole country operated in it will scarcely be necessary to give a description of the different parts surveyed. The general character of the country may be briefly described as follows:—

The main central valley, through which the Canadian Pacific railway runs, lies along Thompson river. The general direction of the river is a little south of west. Above Kamloops, where the North Thompson joins, the river is known as the 'South' Thompson, below Kamloops, the 'Main' Thompson. The width of the valley varies greatly, averaging a little less than a mile. The elevation is about 1,000 feet above sea-level. The land in the valley was, naturally, the first taken up, and is now under cultivation except a few stretches where the soil is alkaline or where water is lacking for irrigation purposes.

The hills rise up on each side to a height of 2,000 feet or more above the valley within a distance of two or three miles, and extend northerly and southerly almost indefinitely, at least as far as the limits of the belt, reaching occasionally an altitude of 5,000 feet. Running north and south there are numerous smaller valleys along the different streams flowing into the Thompson, the North Thompson being the most important. On the tops of the hills, although the surface is much broken with ravines, gulches and rocky ridges, there are considerable areas of nearly level or gently rolling land. Much of this has lain idle for years as it was supposed to be fit only for grazing purposes, but now it is almost entirely taken up and settled on. So far the crops have been better than was expected, even where there was no water for irrigation. 3,000 feet above sea-level is generally considered to be the limit for general farming. From this altitude upwards the surface is more broken with a thicker growth of timber. At 5,000 feet there is usually a dense growth of jackpine. On the lower hills, the southerly and westerly slopes are either open or sparsely wooded; the northerly and easterly slopes are usually timbered with pine and fir, averaging fifteen inches in diameter. During the heat of summer the Thompson valley presents a very dry, burnt-up appearance, the cultivated fields being the only relief. As a rule good crops are obtained on the irrigated lands. The rougher and higher lands are being gradually brought under cultivation but the uncultivable lands must always constitute at least three-quarters of the total area.

I will now describe the several surveys to which the foregoing general description does not apply. Botanie creek runs nearly due south and joins Thompson river a few miles above Lytton station, situated at the junction of the Fraser and Thompson. The valley is well watered and densely wooded, forming a striking and most pleasing contrast to the parched hills of the surrounding country. A good wagon road leads from Lytton to the Indian reserve at the upper end of the valley, and it is much frequented on account of it being a cool, pleasant driveway. The good fishing in a small lake in the reserve is another attraction. The portion of the valley I surveyed lies at the north end, the lower part having been already surveyed. It is about a mile and a half in width and walled in by steep mountains on either side. There is some large timber, mostly on the east side of the creek, but the timber generally is small. As the surface is hilly and considerably broken, and the altitude over 3,000 feet above sea-level, I consider this part of the valley is adapted only for dairying and stock raising on a small scale. One settler has located here but he was absent at the time of the survey.

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Chase creek valley is situated to the south of Shuswap station. The distance from Shuswap by the present road which takes a rather circuitous route to the settlement at the upper end of the valley where I began the survey, is rather more than twenty miles. A much better and shorter road could be obtained at a moderate cost by following the valley of the creek. The general direction of Chase creek is almost due north. The stream takes its rise high up in the mountains and in consequence maintains a fairly steady flow throughout the summer, and furnishes water in abundance for irrigating several large farms at its mouth. In general the creek bottom is very narrow, but in sections 7 and 18, township 19, range 12, there is a little good land but the soil is light. Farther down the creek, in sections 19 and 30, township 19, range 12, and sections 24 and 25, township 19, range 13, there is a larger area of level land, rather lightly wooded. In township 20, range 12, the valley reaches a width of half a mile or more. The land is densely wooded with cedar, spruce and cottonwood. The soil is a black loam with a few inches of vegetable mould covering. The hills are steep and wooded on both sides of the creek. On the east side there is some timber, fir and pine, suitable for milling. There is very little grazing land on the hills.

On Charcoal creek, which runs in a southwesterly direction into Chase creek near the northeast corner of section 19, township 19, range 12 there is a stretch of good bottom land. It begins about two miles up from the mouth of the creek and extends for a distance of three or four miles with a width of half a mile. It is densely covered with alder and willow. The soil is black loam with a good covering of vegetable mould. The hills rise up steeply on both sides; to the south they are covered with thick brush and windfall and on the north they are timbered with pine and fir with considerable open ground affording good grazing.

Both Chase and Charcoal creek valleys are subject to summer frosts. Most of the potato crop was killed last season the last week in July. In places not exposed to the early morning sun the injury was only slight. About half a dozen settlers have located in these valleys but only two were living on their claims at the time of the survey. Dairying and stock raising are the only branches of farming that can be carried on with success, and these only on a small scale.

I surveyed two mountain meadows, one in the Mamit lake country near the head of Skuhun creek, and the other about twenty-five miles to the north-west of Savonas. These wild hay meadows are usually found in a basin shaped depression on the tops of the hills at an altitude of 4,000 to 5,000 feet, quite often centered around a small lake forming the source of a mountain stream. To ranchers looking for fodder these meadows are very alluring but on trial they prove rather disappointing. The disadvantages often more than counterbalance the gains. At such high altitudes the winter is cold and long, and there is very little grazing on the hills as they are usually thickly covered with jackpine. Much time is lost going to and from them. An attendant for the stock is required and although his time is not fully occupied, there is no other work he can do to advantage. Considering these disadvantages I think the meadows are scarcely worth taking up.

Of the two hundred and eighty-nine days in the field, three were lost through bad weather, thirty-five were spent in travelling and moving camp, and the balance, excluding Sundays were occupied in running two hundred and ten miles of line, including retracements, resurveys and traverses. Surveys were made in thirty-four townships.

Game and all kinds of wild animals are gradually getting scarce. The coyotes, alone, although there is a provincial bounty of two dollars per head and the pelts are worth one dollar each, remain undiminished in numbers. These destructive little animals are very much dreaded by farmers keeping sheep and fowl; in fact only a few farmers keep sheep on this account.

According to reports there was considerable loss of timber from bush fires but we saw none nor any damage that had been done.

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The season was an exceptionally good one from a surveyor's point of view, but the summer was too dry to suit farmers or ranchers.

Before closing I would like to refer to a matter which, perhaps, calls for some explanation. Those who have followed the surveying operations in British Columbia will have noticed that the same ground has been practically gone over every few years. This is unavoidable. In making the different surveys on the list I have endeavoured to do all the work necessary in the neighbourhood. At the same time one has to keep in mind the fact that most of the surveys are urgent and therefore as much ground as possible should be covered, otherwise some of the settlers will be subjected to long delays in getting their patents. As it is, some settlers, even in the vicinity of Kamloops, have been kept waiting owing to incomplete surveys, but this was due to unavoidable causes.

I have the honour to be, sir,

Your obedient servant,

JOS. E. ROSS, D.L.S.



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## APPENDIX No. 40.

## REPORT OF A. SAINT CYR, D.L.S.

SURVEY OF PART OF THE SIXTH MERIDIAN AND PART OF THE FIFTEENTH BASE LINE WEST OF  
THE FIFTH MERIDIAN.

EDMONTON, ALTA., November, 1908.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to transmit the general report of my survey of the sixth meridian and the fifteenth base line, west of the fifth meridian.

I left Ottawa on April 9, and proceeded to Edmonton, Alta., to organize my party, Mr. Fred Sykes, who had been appointed as my assistant, arriving on the 15th.

On March 28, after receiving the information that my work would be in the mountains, I wired to the Edmonton merchants from whom I had bought my supplies, to forward them on the winter roads to 'Big eddy,' or preferably to Prairie creek, which is sixty miles nearer to the mountains, and thus ensure their delivery in a better condition and at much cheaper rates. But when I arrived at Edmonton, two weeks later, I learned that only one firm had succeeded in shipping a small quantity of my supplies as far as Prairie creek, and that the greater part were still stored at Lake St. Ann settlement. The two canvas boats which had been ordered for me had not yet been received in Edmonton on April 20 and, as I could not wait for them, I took two old ones which had been used by Messrs. Fontaine and Stewart, on their surveys. One of these boats had been stored at Mr. Angus McDonnell's of Ray, and the other one at Messrs. Garipey and Lessard's. However before leaving the city I wrote the customs officer to deliver to Messrs. Garipey and Lessard the new ones as soon as received from the manufacturers and also advised you by letter what I had done in the matter. On April 20, I hired three teams and wagons to take the men and baggage to Lobstick river, and leaving Edmonton the next day arrived at Lake St. Ann settlement on the 23rd. The packers were sent to paddle river to fetch the Government pack ponies which had wintered in that locality. They were to meet the party at Lobstick river, which was as far as the teamsters would agree to go. Meantime I was arranging with the factor of the Hudson's Bay company for the transportation to Prairie creek of the supplies they had received for me from the Edmonton firms.

On April 24 we left Lake St. Ann and travelled to Donald MacDonald's, where we stopped for the night. Mr. MacDonald, who had the year before done all my freighting to the mountains, had succeeded in reaching Prairie creek with some of my supplies, but his ponies had suffered so on the trip that a month would elapse before they would be again in a fit condition to undertake a second journey. I relied now on the Hudson's Bay company to ship more in the interval.

Between Mr. MacDonald's ranch and Pembina river, the road was very bad and when we arrived at the river, which was quite high, the teamsters wished to turn back; but on being told that Lobstick river could be reached in another day, they consented to cross the Pembina, and brought our outfit to Asselin's store, where I paid them. The wagon road which we followed on this trip ends two miles and a half beyond this place.

On April 30, the packers returned with the horses; some were in fairly good condition, but the majority appeared to have suffered during the cold season. They required now to be fed hay and grain regularly before they would be fit to do the heavy work which would soon be required of them. So I bought all the baled hay that I could get at Lobstick river, and procured grain from the settlers in the vicinity of Isle lake and from some of the railway contractors at Wabamun.

While camped at Lobstick I heard from parties returning from the west, such discouraging reports concerning the old Jasper trail, in regard both to the scarcity of grass and the impossibility of travelling on it with heavily loaded ponies, that I decided to try another trail known as 'Jacques' trail. Previous to this year this trail has seldom been used by parties going to the mountains, because it is longer than Jasper trail, but as good pasture is found at intervals of ten or twelve miles, and as the road passes over high lands with very few small swamps, it proved to be the better one. It gave me also the opportunity of seeing the country between Chip lake and the valley of McLeod river.

Consequently, on May 11, we broke up camp and going northwards by a road which we had to open across township 53, range 8, we came to this trail, which we followed to the 'Hay buttes' five miles farther, where we camped. Our other camps were at 'Coldwater butte,' 'Blueberry hills,' where I lost one of my tents through the carelessness of some of my men, who set it on fire, and at the McLeod river (2,500 feet above the sea), where we arrived on the evening of May 14. The river was too high to be safely forded by loaded pack ponies, so on the next day all the baggage was ferried across in the canvas boats, and the horses swam the river.

The country east of the McLeod varies from undulating to high rolling, except through Blueberry hills, which have an altitude of 2,900 feet above the sea. The soil is good and the land can be easily cleared of the scrub, poplar and brush which cover it. Through these lightly wooded areas are many prairie openings and some hay meadows. This district is well drained by numerous creeks flowing in every direction. Timber sufficient for the needs of the settlers is also found in scattered bluffs all over the country.

From the left bank of the McLeod the trail leads to the top of a bench overlooking some large flats of partly open lands, where we saw the tents of some new settlers. For thirty miles this trail keeps well on the high land west of the river, crossing in that distance the valleys of Trout creek and Muskeg river. On May 20 we arrived at 'Big eddy' settlement. The horses, which had gradually improved, were loaded with more supplies, and we continued our journey to 'The Leavings.' Here the trail bifurcates; the branch over which I travelled in the fall of 1907 and which follows the fourteenth base line, has since been abandoned, as it is blocked by deadfall. We, therefore, took the southern trail along the left bank of the McLeod, which we followed for two days more, thence turning westward on Gregg's trail we crossed the divide (4,500 feet above the sea) between Athabaska and McLeod rivers, and came down to the last named river by the valley of Trail creek. On May 29 we pitched camp at the mouth of Prairie creek.

At Gregg's warehouse, which is three miles farther, I found the supplies which had been brought by McDonald's pack train. With what I had procured at 'Big eddy,' there was sufficient to allow me to proceed with my surveys till the end of June, but I expected that in the interval those being shipped from Lake St. Ann settlement would be delivered here.

Opposite the mouth of Prairie creek Athabaska river flows in one deep channel, and its crossing is always effected on rafts, while the pack ponies have to swim. The force of the current near the bank is, however, somewhat broken by an island which lies close to the right shore and a short distance above the crossing, while from the opposite shore projects a rocky point below which is a stretch of slack water which materially helps in effecting a landing with loaded rafts.

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After transferring the outfit to the left bank of the river, we proceeded to the valley of Gregg creek and camped three miles south of lower Gregg lake. Whilst the men were building a cache I sent the packers to Prairie creek for the other supplies, which had just been brought from Lake St. Ann settlement. When they returned to camp with the loads I found that although a great deal of the provisions had been utterly spoiled by water, we still had enough left to last for four months.

The advantage to be gained by putting my depot in that locality was twofold. I would not again have to cross the Athabaska, which remains very high during the whole summer, and in cases of urgency my supplies at all times would be easy of access, because all the trails in the district converge to it. There was, however, a drawback to this, for these trails are sometimes used by the Indians, and it so happened that during the summer our cache was broken into by a band of marauders from the Grande prairie district, who made away with several articles belonging to the pack outfit, besides a large coil of sling ropes and some tools, which I presume they needed for building rafts across Big Smoky river, which they would have to cross at its highest stage of water. On June 8 we travelled westward on the Big Smoky river trail and came to Hay river, which had overflowed its banks and was running so swiftly that it was dangerous to attempt to cross here. So the next day we continued southwards along its right bank, and at half a mile above the fourteenth base line effected a crossing at a point where the river is quite wide and its bed free of boulders. The men were engaged one whole day (June 10) in cutting a road over the hills to the northeast corner of township 52, range 1, west of the sixth meridian, which was the point of commencement of my survey.

My instructions were to produce over the Rocky mountains the sixth meridian, which, in 1907, had been surveyed south to the northeast corner of township 52. The object of this survey, besides supplying data for future work, was to check the intersection of this meridian with the thirteenth base line, a point which has been located by a traverse survey beginning at the southeast corner of township 51, range 27, west of the fifth meridian (north side of the 13th correction line) and carried southwesterly along the foot of the mountains.

## DESCRIPTION OF THE COUNTRY ADJOINING THE SIXTH MERIDIAN BETWEEN THE THIRTEENTH AND FOURTEENTH BASE LINES.

Between the fourteenth base and the point where the sixth meridian enters the Rocky mountains there are twelve miles of rough country made impassable for travel owing to the accumulation of fallen trees. To make any sort of progress required the help of every member of the party, the packers themselves frequently exploring for the best location of the road, and cutting the trail afterwards. There are several ranges of hills generally bearing east and west and covered with standing fire-killed trees. They have an altitude of 5,500 feet on the line, though some summits farther west are much higher. Between these hills, two streams, heading from glaciers, wind their course. The principal one called Hay river is two chains wide. Its banks are low and it meanders in a narrow valley from west to east across the centre of township 52, but shortly after crossing its eastern boundary it turns north. The other one is Solomon creek, in township 51. It receives numerous tributaries from the south and joins the Athabaska where it comes out of Brulé lake.

This country is not adapted for farming, even if the climatic conditions are favourable, which is very doubtful. At the present time it is thickly covered with deadfall, which prevent the growth of grass. Should, however, another fire overrun it, these would disappear and the exposed soil, aided by the copious rains which fall in this district during the early summer, would be covered with luxuriant vegetation, similar to the grazing lands found in some parts of the valleys of the Athabaska and Hay rivers. In the foothills south of Solomon creek I noted in section 25, township 51, a belt a mile wide of green timber (spruce ten inches to thirty inches, pine

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ten inches to fifteen inches) growing on the northern slope of a high rocky ridge. Then comes one mile of fire-killed timber, followed by more green timber (pine twelve inches, spruce eighteen inches, balsam twelve inches) which decrease in size and quality as one ascends the side of the mountains. Finally in the middle of section 36, township 50, the timber line occurs at an altitude of 5,800 feet above the sea. From this point the line crosses one ridge after another, all connecting peaks nearly 8,000 feet high. These ridges are separated by deep chasms across which I had to make a triangulation to determine their relative positions on the line. Thus the survey was brought to the middle of section 24, when owing to the long and tiresome walks over deadfall and the stiff climbs we had to make, it was found impossible to make reasonable progress with the survey. In these mountains no pass exists through which we could bring the pack ponies, and the only alternative that presented itself was to send the outfit around the mountains, and try to reach again from the south the station which I had established at the present end of the line. Consequently on July 9, we returned to Solomon creek,, which we followed eastward to Brulé lake. Thence by following the valley of the Athabaska we came to Moose creek—the round trip occupying three days. We were still a long way from our destination. After exploring both sides of the valley of Moose creek, which I found obstructed by great quantities of fire-killed timber, I decided to follow the bed of this stream. All went well for the first day, but on the second we came to a canyon where further progress was prevented by numerous larger boulders and log jams. We had to climb out of this and managed to get to the edge of a plateau where for two days every available man in the party worked hard cutting a road for the pack train. After crossing innumerable deep gulches we reached again the same creek at a point one mile below the mouth of one of its northern tributaries. Its valley proved to be the right one to follow to the mountains where we had erected our last signal. From this point the sixth meridian was produced southward along the eastern slope of the mountains as far as the northeast corner of township 48. This line crosses Moose creek in section 36, township 49. West of this point, the valley proper of Moose creek is wider than at any other part of it which I have explored. Half a mile east of the line it becomes more confined as the hills on each side close in upon the creek leaving for its passage only a narrow gap between high rocky walls where the water rushes down for five miles. At the end of this canyon a dam could be easily built and the water thus held utilized for power. In the middle of section 25, the line intersects a deep ravine. Along the banks of a small stream which flows in it, I noticed a thin seam of coal.

South of section 25, the line passes through a brulé and for three miles ascends the eastern slope of the rugged mountains which rise west of the Athabaska. After crossing many deep gulches, it reaches the highest point above the valley, near the corner of section 1. Thence it descends to the wooded flats of the river which here divides into many channels.

In accordance with my instructions, I then went on with the survey of the sixth meridian, which I ran across the valley of Athabaska river. From the thirteenth base line I had to open the line through two miles and a half of pine and spruce wood. A heavy undergrowth covers the valley as far as the crossing at section 24. Stony river, a turbulent stream which, on emerging from the mountains into the gravel flats, divides into several channels by which it empties into the Athabaska. The land west of this is level but very stony. Half a mile south of Stony river the forest ends and we came to a prairie three-quarters of a mile wide, but extending less than half a mile on each side of the line. The soil is white clay and the subsoil gravel. South of this prairie a belt of green spruce six to twenty-four inches in diameter and pine six to fifteen inches in diameter extends to the north shore of Jasper lake in section 13.

This lake lies at a small angle to the meridian and where the line crosses it the width is over two miles and a half. Its length, however, must be nearly five miles and

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its width would average one mile. Its west shore is abrupt and rocky; on the north and east sides, however, there is a fine sandy beach which extends to the head of the lake. East of Jasper lake from which it is separated by low sandy hills covered with jack-pine, there is another narrow lake called by the natives 'Fish' lake. As it is fed by creeks and springs from the mountains its water is remarkably clear, unlike Jasper lake whose waters hold in suspension so much detrital matter continually brought in by Athabaska river that it remains muddy the greater part of the year.

Fish lake lies close to Jasper lake, into which it drains by a narrow and tortuous outlet. At this point the distance between the two lakes is but a few chains, but before reaching the open water in Fish lake one has to go a long distance through tall reeds. This growth of reeds and grasses, with the soft marshes which surround the lake, make it almost impossible to effect a landing anywhere without wading. Fish lake abounds with pike and whitefish.

Beyond this lake the line was surveyed to the quarter post on the east boundary of section 25, township 47, range 1, west of the sixth meridian.

As Jasper and Fish lakes extend across the whole width of the valley proper to the Athabaska there is consequently no bottom lands here for several miles. The hills which rise from the shores of these lakes merge into a series of benches, of which the highest is fully six hundred feet above the present level of the valley. The slopes of these hills are sometimes grassy but more frequently wooded with jackpine.

Level lands reappear again along the river and beyond the head of Jasper lake, but judging from the dense growth of small spruce, they must be swampy and also liable to be flooded at certain seasons. To avoid crossing these bottom lands, the Jasper trail makes a long detour to the west in the foothills.

Opposite the old Jasper house, there is another flat of half a mile between the right bank of the Athabaska and the foot of the mountains. It is covered with brush and willow and ends two miles farther south where the mountains approach Fish lake.

After the sixth meridian had been produced across Jasper lake, I found it necessary to cross the Athabaska once more so as to bring the camp closer to the work.

The packer had to swim the horses where the river issues from the lake, a bad crossing on account of the swift current which rushes among the sharp rocks which line the right bank. Some of the ponies which had parted from the bunch were swept down by the violence of the current amongst these rocks and landed with the greatest difficulty when the survey was completed, I did not care to attempt that crossing a second time, and although it took a day longer I went southwards along the shore of the lake and the river to a point opposite Moberly's ranch. Here we had to cross three wide channels before we came to the left bank. From August 10 we travelled in the valley of the Athabaska and after crossing that of Solomon creek arrived at our depot on the 18th.

Near the northeast corner of section 30, township 52, range 26, west of the fifth meridian, there is a trail which is always followed by the native hunters going from Prairie creek to the fur trading posts on Big Smoky river; at that point also there starts another trail, at present seldom used, which leads to the junction of Gregg creek, with Hay river on the north boundary of township 53, range 26; thence it goes by the valley of this river to that of Baptiste river. I decided to follow that route to get to the fifteenth base line which I had been instructed to survey westwards from the northeast corner of section 34, range 20, where Mr. Saunders had quit work in 1905. The distance between our depot and the mouth of Gregg creek is ten miles by the trail, which, not having been travelled for years, required some heavy chopping through windfall before it was made passable for the ponies. To avoid the marshes at the lower end of Gregg lake and its outlet, this trail cuts across the hill for five miles. It then enters a level country with patches of prairie surrounded by scrub, willow and small timber, which would be easily cleared. The soil is a yellow clay

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which grows bunch grass in great profusion, but owing to the altitude of the country (3,700 feet above the sea) it is doubtful if crops could be raised. It would, however, be a good grazing country, though of limited extent.

During my stay in the mountains in the early part of the season, several of the pack ponies had suffered from a contagious disease which had left them in a weakened condition. Fearing to lose any if I worked them too hard, I decided to load on rafts the bulky part of the outfit, including the iron posts required for the survey of the fifteenth base, and to send the horses with light loads by the valley of Hay river.

On August 21 we began our voyage on the river. As its navigation was unknown to us, I resolved to keep ahead of the party with the small canvas boat in which I had placed my instruments. The packer was also instructed to bring the pack train by this valley and I left to help him on this trip a man who, the year before, had passed several times through the valley and so became acquainted with the different fords on the river and the country best suited for travel on either side, for in case of the loss of the outfit through accidents which are always possible when navigating these tortuous and swift streams, we could have been joined by the pack train which would never be very far behind. On the first day out on the river, the heavily loaded rafts frequently ran aground on the bars but were always brought into the deepest channels which the men soon learned to pick out. In the middle of the day we went over a rapid full of large boulders which could not all be avoided and on which the rafts stuck fast. As I had them built sufficiently strong to meet such obstacles they came out of it without anything having given way though it took considerable time and some hard work to extricate them from their dangerous position. These difficulties disappeared as we proceeded down, the volume of water in Hay river being gradually increased by its many western affluents. The first important one noticed flows out of a canyon joining the river about two miles south of the fourteenth correction line. In this vicinity the valley narrows to a quarter of a mile and from each side rise high sandstone cliffs. Then comes an interval of several miles where from the banks of the river, large flats extend half a mile to the foot of the hills. A few of these flats are in prairie or hay meadows, but the majority support a heavy growth of merchantable timber.

The largest western branch of Hay river was passed in township 56, range 24. It is the same stream which at twenty miles farther west crosses the sixth meridian. Two miles below its mouth the river turns more to the east for four miles, and after receiving two smaller streams which rise on the highlands west of Athabaska river, flows again in a general northerly direction until it meets Baptiste river.

On August 25, we were within a mile and a half of the fifteenth base line, waiting for the packers who did not return to our camp before August 30; instead of coming by the flats along Hay river, as they had been instructed, they ventured with the pack train on old hunting trails which led nowhere in particular. Afterwards in order to extricate themselves from the impassable deadfall which covers the whole country, they had to cut several miles of road to enable them to reach the valley of the river again. On that trip some of the horses played out and others were brought in in a pitiful condition. Thus delayed it was only on September 1 that we got to the place where the base line intersects the valley of Hay river. Two days later we reached the Athabaska.

I had noted that the whole country east of the river was heavily timbered and concluded that no pasture would be found there except perhaps at distant intervals, which proved to be the case. Accordingly I had the sick horses driven to some hay meadows west of the river and left them in charge of one man. Taking those that were able to carry loads I continued my voyage eastward and on the 11th reached the line and began its survey at the northeast corner of section 34 township 56 range 20.

In going from Hay river to range 20 the road has been cut as near the base line as the topography of the country permitted; we thus knew of the few spots where feed



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could be found for the ponies. It was also a great help to us when engaged in the survey, for men whom otherwise I would have had to send to explore and cut this trail, were employed at mounding, and chopping on the line.

On September 11, we pitched camp at a mile and a half west of the corner of section 34, township 56, range 20, and on the next day I began the survey of the fifteenth base line.

On October 7, the pack ponies were brought back to camp from the valley of Hay river, where they had been kept till the survey of the line had been completed to range 25. Though it was late in the afternoon when the packer arrived, we had to move because there was no pasture for miles around on the high lands where we had been camped; but the main reason was that nearly the whole party had started afoot several hours before, improving as they went the road which we had to follow, in the direction of our next camp. As it would never do to disappoint them, we had, on account of a late start, to travel part of the night till we caught up to them. They had gone as far as the river, which they had not been able to cross, and as it was pitch dark when we reached that place with the pack train, we had to stay there till morning.

On this trip we followed the valley of Hay river, made good progress, and always found good pasture for the ponies, when time came to stop for the night. We arrived at Gregg lake on October 11, and two days later camped at the mouth of Prairie creek. At Gregg's store I took supplies for three weeks, which is the time it generally takes to cover the distance between the mountains and Lake St. Ann settlement. I also took ten bags of oats, which had been left there by Mr. A. H. Hawkins, D.L.S., who kindly authorized me to do so. As it was late in the season the grass along the road would necessarily be scanty, but with this grain I expected to bring all my ponies safely as far as Sinclair ranch (Big eddy) where I could get oats which I had stored there in the spring.

We left Prairie creek on the 14th and went by the old Jasper trail to Trail creek, where we turned east. In crossing the divide of the McLeod, we were overtaken by a heavy storm, but this did not prevent us from continuing our journey till we got down in the valley of the McLeod. On the following days we passed several new buildings, put up by parties who have taken land in the most favourable spots along this river. The land where it has been ploughed shows a black sandy loam, which ought to grow all kinds of crops. It remains, however, to see how the climate will affect these as the altitude of the river flats is 3,600 feet above the sea.

One man who owns a timber limit near the headwaters of the McLeod has taken up land also one mile above The Leavings, where he proposes to erect a sawmill.

On October 19 we arrived at 'Big eddy,' in another snowstorm, which left the ground covered with eight inches of snow. On October 22, the storm having abated, we left for Lobstick river, taking a road different from the one followed in the spring. This change was made necessary to enable us to procure from the settlers along the route hay for the ponies, which could not subsist on the dried slough grass.

After leaving Sinclair's ranch we followed the left bank of the McLeod for two days, crossing to the opposite bank near the mouth of Muskeg river. Two miles below is Smith's ranch, where I decided to camp, because it was the last place where it would be possible to buy hay for the ponies. From Smith's ranch the trail runs along the right bank of the McLeod for eight miles more; then it turns easterly and leads to Goose Grass encampment, which is as far as the right of way of the Grand Trunk Pacific has been cleared this fall. For four days longer we travelled on this road, arriving at Chip lake on the night of October 27. The grading done through this district by the Grand Trunk Pacific ends near the point where Little Lobstick river empties into Chip lake.

On October 29 we arrived at Pembina river, partly frozen over from both sides, except for a channel in mid-stream, carrying much floating ice which had jammed a



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short distance below the landing. Fearing to be delayed here for several days by the complete blocking of the river, as this might easily happen at that season, I immediately sent the ponies across the stream, where there chanced to be some hay which I bought from F. W. Thompson, a resident of the place and the owner of a large living tent in which he allowed us to spend the night.

The next morning it took several trips with a strongly built boat able to stand the pressure of the ice, before the outfit had been safely brought across the river, when we continued our journey to MacDonald's ranch, fifteen miles east of Pembina crossing.

The three men I had left to help the packer with his work returned later on with one horse that had played out on the road.

From Mr. MacDonald I hired three rigs and proceeded to Lake St. Ann settlement on November 2. The ponies were driven to Ray and left at Mr. Angus McDonnell's farm, as I had been instructed to do. That evening I met Mr. McDonnell at St. Albert and informed him that the horses were at his ranch. Later on he returned to Edmonton and signed a contract for the keeping of these ponies till they are required again.

#### GAME.

While surveying the sixth meridian across the mountains, goats were seen, and judging from their well beaten paths they appear to be in great numbers. Some of these paths were followed at times, and they invariably proved very useful in leading us around precipitous and deep gorges which lay undetected across our way, and where we would often have been delayed.

In the valleys of Hay river and Solomon creek and those leading to them, the moose roam and the Indians who depend on this game for their supply of meat must often run across them as shown by the stagings erected at frequent intervals for drying the meat.

This country produces a great variety of berries; bears who subsist mostly on these during the summer are quite common. Small game and water-fowl are scarce, only a few ptarmigan or 'white partridge' having been seen in the lowlands.

Beavers are increasing in this district. The freshly cut poplar trees on the banks of Athabaska and Hay rivers show that they are now returning to these streams, while on all the creeks east of Athabaska valley I saw at short intervals several newly built beaver dams, replacing old ones which had been broken by the native hunters. Their well beaten roads leading to these dams would indicate that many of them are at work here.

There is splendid trout fishing in the larger streams, and whitefish can be caught with nets in all the lakes. Pike is also caught in a few of these lakes, but they are more plentiful in the streams where the current is sluggish and the beds covered with aquatic plants.

I have the honour to be, sir,

Your obedient servant,

A. SAINT CYR, D.L.S.

## APPENDIX No. 41.

## REPORT OF J. B. SAINT CYR, D.L.S.

SURVEY OF SETTLEMENTS, TOWNSHIPS AND OUTLINES IN THE PEACE RIVER DISTRICT.

MONTREAL, February 1, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report of my field operations during the past season in the Peace river district.

In accordance with your instructions dated May 1, 1908, I left Montreal on the 12th and reached Edmonton on the 17th. After a few days spent in Edmonton to hire men and make arrangements for the trip I started north on May 23. On the 29th we left Athabaska Landing on board of the Str. 'Midnight Sun,' making connection with the Str. 'Northern Light,' on the Slave river. We arrived at Slave Lake settlement on June 5. On my arrival there I bought three teams of horses, wagons, harness, &c., to complete my outfit, and on June 6, I started for Peace River crossing, where I arrived on the 10th. The water in Peace river was very high and the current quite swift, carrying even trees and logs down stream. As the ferry was crossing the river, the roots of a floating tree caught it, breaking the ropes that held it to the cables and it was carried down stream a long distance near a high cut bank on the opposite shore. As it was very risky to cross my outfit on the Hudson's Bay company's little ferry, with that state of water, for a few days at least, I completed the survey of the settlement commenced last year.

On June 15 I succeeded in crossing my outfit on the little row ferry and the next day I was travelling towards Dunvegan. I arrived at the twenty-first base line on the 18th, and the next day I began the resurvey of that line across ranges 3 and 4 west of the sixth meridian, after which I started the subdivision of townships 80, ranges 3 and 4; this subdivision was completed on September 18. All the monuments on the original base have been destroyed and other monuments have been erected on the correct base. The land subdivided has a very fine aspect, the surface being prairie and bluffs, and the soil is very good. The country is generally level or undulating with the exception of the land adjoining Peace river, Muddy creek and Boucher creek, where it is broken and hilly. Hay is plentiful all through that country and spruce for building or fencing purposes can be procured almost everywhere. Fuel is plentiful also. The different streams draining that country furnish a large quantity of good water in the spring. With very little work the settlers could dam those creeks in different places and have a good supply of water all the year round. I believe also that water can be found by boring deep enough. The Peace River crossing and Dunvegan wagon road, and the Green island road cross those two townships from north to south.

Having completed the subdivision of those townships, the traverse of Peace river and the survey of a few lots at Dunvegan, I afterwards ran the east boundary of township 79, range 5 west of the sixth meridian as far as the correction line. The surface is prairie and bluffs. The soil is a black loam varying in depth from four to six inches and overlying a clay subsoil. This open country extends about two miles to the east of the line, and a long distance west of it. Dunvegan and Spirit river wagon road passes

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west of the line and crosses the country in a southwesterly direction. About the end of September I went to township 78, range 3, to complete the mounding left in the fall of 1907, and while there I surveyed the south boundary of township 79, range 3. This township is thickly timbered with poplar, spruce and large willow; the soil is very good and the country level with the exception of sections 1 to 6 in the vicinity of Spirit river and Brulé river where the land is broken and hilly. There are a few scattered sloughs in that township but no prairie. The slope of the hills bordering the south shore of Peace river, north of that township, is thickly timbered with spruce varying from ten to eighteen inches in diameter and suitable for lumbering purposes.

On October 18 I started for the twentieth base line. Having established my camp where Brulé river crosses the Grande prairie road, I began the survey of the east boundary of townships 77, and 78, range 5. This line was completed to the correction line on November 26. Of all the country west of that line, nearly the whole of township 78 and the north one-third of township 77 is prairie and bluffs. The remaining part of this last township is thickly timbered with poplar, spruce and large willow. I also proceeded to survey the north boundary of township 78, range 4, west of the sixth meridian which I completed on December 7. Nearly half of the township is prairie and bluffs, and the soil is very good; it is a black loam from four to eight inches in depth resting on a clay subsoil. The eastern half of the township is timbered with poplar, spruce and large willow. The country is undulating in the east, and rolling towards the west boundary of the township.

The soil in that country situated between Dunvegan, Spirit river and the twentieth base line contains a certain amount of moisture rendering it very suitable for farming purposes. Though water appears to be scarce in some portions of Spirit river prairie, I believe that water can be procured by boring deep enough. The settlers living along Spirit river have constructed dams in different points and have a good supply of water for summer and winter. Springs exist on the sidehills of the many ravines crossing this country, proving that there is some water in the ground.

The settlers of this country have succeeded well in farming, ranching and gardening. The crops of the last two years have been very encouraging to them and indicate a good prospect for the future of that northern country. Messrs. English and Calkin of Spirit River had last fall a crop of about three thousand bushels of oats and wheat, heavy and hard grain well ripened. Ranchers are doing well in that district, having no difficulty in procuring hay; the prairie is also a very rich pasture. There is generally no early frost to injure the crop. When this country is cultivated to a larger extent the heat of the summer days penetrating the soil will keep the frost at a distance during the night. The snow is never very deep in the winter and horses and cattle may be seen on the prairie all the year round. The chinook wind blows often over the country, thawing all the snow in a couple of days. The temperature is fine and mild in the fall, in the first part of the winter and in the spring. There are none of those strong winds blowing for weeks as in some other parts of the territory. Communication is getting easier every year; the roads have been improved lately and bridges built on different points of the trail. There are two steamers making the service from Athabaska Landing to the upper end of Lesser Slave lake, the Str. 'Midnight Sun,' on Athabaska river, and the Str. 'Northern Light,' on Little Slave river and on Lesser Slave lake. Those steamers belong to the Northern Transportation company. The trip from Athabaska Landing to Lesser Slave lake is made in four or five days at the most. There is a cable ferry at Peace River crossing and there will be one also at Dunvegan next summer according to reports. The wagon road to 'Grande prairie' was also worked last summer. Without doubt the Peace river district has a great future and the country is so vast and the soil and the climate so good that settlers will find there nearly everything to meet their requirements.

Having completed the survey of the outlines of townships 77 and 78, range 4, and townships 79, ranges 3 and 5, on December 7, I started for Edmonton. As it was

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impossible to cross my outfit at Dunvegan for several weeks, I decided to travel by the winter road passing at Egg lake, crossing Smoky river and Winagami lake. On December 18, I arrived at Lesser Slave lake, where I left my outfit, making arrangements for the wintering of the horses, and started immediately afterwards for Edmonton. The second day after my arrival at Edmonton I started east and arrived in Montreal on December 31.

I have the honour to be, sir,

Your obedient servant

J. B. SAINT CYR, D.L.S.

## APPENDIX No. 42.

## REPORT OF B. J. SAUNDERS, D.L.S.

## SURVEY OF PART OF THE ELEVENTH BASE LINE WEST OF THE FIFTH MERIDIAN

GENOA, February 2, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR.—I have the honour to submit the following report on the survey of the eleventh base line, west of range 8, west of the fifth meridian, surveyed under your instructions, dated March 5, 1908.

Having organized my party at Edmonton on April 21, we proceeded to Lacombe by rail, and from that point by the main road and trail to Saskatchewan river at Rocky Mountain House. The trail was found even at that early season in a very wet condition, and we could carry only very light loads. Lumber was taken from Lacombe, from which a boat was constructed to assist in crossing the Saskatchewan with our supplies, there being no ferry in operation at the time. One was subsequently built by the provincial government of Alberta and made ready for traffic early in July. This ferry is situated about two miles down stream from the old Hudson's Bay company fort at Rocky Mountain House.

We reached the northeast corner of township 40, range 8, west of the fifth meridian, with the camp on May 5, and after observing for time and azimuth the work of producing the line westerly was duly commenced and carried on almost continuously until December 1, by which time it was surveyed to range 19 west of the fifth meridian.

During the early part of the season, and, in fact till the middle of July, the weather conditions were most unfavourable for rapid work on account of the heavy and almost continuous rainfall.

Throughout ranges 8, 9, 10 and 11 the line traverses a country fairly open in places, especially along the streams, and where there is not much timber fairly good grazing is found for horses. The south branch of Baptiste river crosses the line three times in ranges 10 and 11 and joins the north branch of the same stream about three or four miles to the north of the line in range 10. Grasses grow most luxuriantly along this stream. In ranges 8 and 9 quite a number of small muskegs were met with, but the greater part of these could be drained easily with the opening up of the country. The watershed throughout the first three ranges is very narrow between Saskatchewan and Baptiste rivers, and the land is generally rolling in character.

In ranges 12, 13 and 14 higher country with much burnt and fallen timber was encountered, rendering it necessary to make a detour to the south to the Saskatchewan river to find a practicable route to move camp on. The outer range of the mountains was crossed in the first mile in range 15. The general direction of these mountains is northwesterly and southeasterly; close to the crossing of the line they reach an elevation of about 7,300 feet above sea-level, as determined by aneroid barometer.

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Ranges 15, 16 and 17 consist of very hilly country. The Bighorn range of the mountains was crossed by the line in the westerly part of range 17 at an elevation of about 8,225 feet above sea-level as determined by aneroid; the watershed between Saskatchewan and Brazeau rivers lies near the centre of range 16. The easterly part of range 18 is very mountainous and practically impassable. The chainage was carried over this portion of the line as well as the westerly portion of range 17 by triangulation. The westerly portion of range 18 consists of rolling country, fairly well timbered, with open areas along the stream now known as Little Brazeau river.

The line was extended one mile and a half into range 19 and practically up to the foot of the next range of snow-capped mountains. At a favourable season of the year it could probably be produced a mile or two farther without much difficulty.

Generally speaking, the soil traversed by this base line is of good quality and varies from sandy loam to a clay loam, with more or less sandstone and limestone in the westerly ranges. In range 9 some fairly good merchantable spruce timber is found. There are also some very good patches of spruce and pitch pine at different points along the line in ranges 15, 16 and 17, all of which are quite accessible to streams flowing either to the Saskatchewan or Brazeau. In all other parts there is an abundance of timber consisting of poplar, pitch-pine, spruce and some tamarack suitable for building purposes.

Outcroppings of lignite were noticed in section 6, township 41, range 11. Large seams of the much sought for Brazeau coal are found on section 34, township 40, range 18. These were connected by survey to the base line.

In Baptiste river, Mire creek and Little Brazeau speckled trout of excellent quality are found in great numbers. Many moose and jumping deer were seen throughout the whole season.

The country is one of the best watered that I have met with in twenty-five years experience in the field, and should be well adapted for stock raising in limited numbers as far west as range 15.

Some eight or ten families of settlers have already located on Saskatchewan river in the vicinity of Rocky Mountain House in townships 39, ranges 7 and 8; they seem to be doing well and are well satisfied with their prospects; they are engaged in stock raising and have grown some grain. Vegetables ripened last year without any injury from frost. Along Saskatchewan river as far west as range 13 there are some excellent hay flats where the native grasses grow to a height of almost three feet.

The section of the country traversed by this base line can be reached by road and trail from either Lacombe, Red Deer or Innisfail by way of Rocky Mountain House. From Rocky Mountain House westerly there is a fair wagon road along the north side of Saskatchewan river for about twelve miles; it then swings north to the Baptiste, down which stream wagons have been taken fifteen or twenty miles. With my party I had a road cut up the south branch of this stream and beyond for a distance of about twenty-five miles for the purpose of taking in supplies by wagon; the end of this road is quite close to Saskatchewan river in township 40, range 12. From this point on, pack horses had to be used exclusively. The western portion of this base line can be reached by pack trails from either Morley, Banff or Laggan.

In my opinion there are no very great physical difficulties to be encountered in building a railway line via Rocky Mountain House to the Brazeau coal fields from either Lacombe, Red Deer or Innisfail, or even from Edmonton or Strathcona, striking the coal areas almost direct from either of those points. Such a line would open up a good country and at a very early date give the whole country along the Calgary and Edmonton branch of the Canadian Pacific railway access to coal fields where coal of excellent quality for manufacturing and domestic purposes is found.

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The member of my party engaged in exploring the country on either side of the line did good work in determining its physical characteristics. The results of his works are shown graphically on a sketch plan accompanying this report.

A line of levels was run along the base to the end of the work. These levels were carried over the Bighorn range trigonometrically. They are reduced to a datum determined by a series of barometric readings taken at the northeast corner of township 40, range 11, west of the fifth meridian, and were carried back to Saskatchewan river in range 7. Permanent bench marks were established at about half-mile intervals along the line and at the waters edge of Saskatchewan river. Connection to any of these bench marks by a line of levels reduced to sea-level can be made at a future time, and thus a profile with correct elevations of the whole base line can be prepared.

I have the honour to be, Sir,  
Your obedient servant,

B. J. SAUNDERS, D.L.S.



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## APPENDIX No. 43.

## REPORT OF H. W. SELBY, D. L. S.

SURVEYS IN LESSER SLAVE LAKE DISTRICT.

TORONTO, February 2, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following general report on the survey of township outlines and the subdivision of lands situated in and near the Lesser Slave lake district, performed under your instructions dated February 7 and March 6, 1908.

Leaving Toronto on March 10, I proceeded to Edmonton, organized my party and transport equipment, and on the 20th left for Lesser Slave lake. Contrary to previous years the roads were very heavy with drifting snow, and this delayed our arrival at 'Little prairie,' where my work was to begin, until April 8. 'Little prairie' is on the Peace river road about sixty miles northwest of Lesser Slave lake. The snow was still about a foot deep in the woods, and there was no feed for the horses near the end of the twenty-first base line. I was instructed to continue the base line east, across ranges 20 and 19 from the northeast corner of range 21, and subdivide the land in those ranges suitable for settlement. The camp was placed where hay could be got near Bearhead creek, and a road cut westerly to within a mile of the point of commencement, over which the party was driven to and from work while running the base line and subdividing the east half of township 81, range 20, south of Heart river. The melting of the snow during the time this work was being done made it very troublesome. The country being nearly level and the ground deeply frozen, the water lay on the ground to the depth of several inches until after the middle of May. Very little mounding could be done except to clear the ground of logs and brush and mark out the pits, taking off the top soil where possible and letting in the warm air to thaw the ground. In August I sent two men to complete the mounding. The lands suitable for settlement within the near future, are situated in the east half of township 81, range 20, west half of township 81, range 19, and part of the northeast corner of township 80, range 19. These were subdivided. The Peace river road cuts these lands from southeast to northwest, through a strip of prairie from half a mile to a mile in width. The soil is a rich black loam on clay subsoil, and is covered with an abundant growth of upland hay. This prairie is suitable for farming purposes, but at present it is used entirely for grazing and for the hay grown upon it by the half dozen squatters who live there. The timber on the remainder of the subdivided land is chiefly small poplar and willow brush. There is very little waste land in those surveyed, and when it has been demonstrated that grain can be grown there profitably, and being on the leading highway through this country, it should soon be settled by a good class of homesteaders. Until the past year no white settlers had located on these lands, but three white settlers have begun to make improvements and had sown a few acres of grain as an experiment. This looked very well when I last saw it, but there is not likely to be much grain grown until railway facilities are secured.

My assistant Mr. W. A. Scott arrived on June 3, having been on the road since May 4. He was at once instructed in his duties. After ascertaining his capabilities, and his desire to gain all the experience possible, I placed him in charge of the transit under my personal supervision and it is with great pleasure I record my appreciation of his services and his willing, energetic and careful fulfilment of the duties assigned to him.

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This part of your instructions having been carried out, on June 10 we began our return to Lesser Slave lake, where I made a retracement survey and some other measurements in the settlement, required by you. The water in the rivers and lake being very high, on the 17th I sent the horses around the lake and shipped the supplies and outfit by boat to Swan river, where we were met by the teams, and camp taken to Mr. Hunt's near the northeast corner of township 72, range 10. At this time of the year the water from the hills causes the river to rise to such a height as to make the fords impassable except by boat. The Alberta government have since built a bridge one thousand one hundred feet long across the outlet of Buffalo bay at the west end of Lesser Slave lake, and I got the Indians to help build a bridge over a bad slough, one hundred feet wide, about one mile east of the east boundary of township 73, range 12, where several teams have been drowned, and many narrowly escaped the past season. Driftpile river, at times is twelve feet deep and two chains wide, and there should be a bridge built, to give the settlers at Swan river an outlet for their mail and to obtain their supplies. Of course at low water the ford is good and quite safe, but I have seen the water rise five feet in two hours as the result of a shower of rain. The water at the mouth of Sucker creek and Little Sucker creek is always at the level of the lake and with a good bottom of hard sand is always safe though the water sometimes is deep enough to come into the wagon box and damage goods. When these obstacles are removed the road to Swan river will be a good one.

Up to this time there was not grass enough on the Peace river road for working horses to live upon, but when they got to Swan river prairie it was from nine inches to twelve inches high. The improved condition of the Peace river road was very noticeable and whereas in 1904 a load of one thousand two hundred pounds was enough and sometimes too much, this year the freighters were taking from two to three thousand pounds at a time. My work at Swan river was to subdivide such portions of the country as were suitable for farming purposes in the near future. I found upon examination that parts of townships 72, ranges 9 and 10 and townships 73 and 74, range 10, being the lands drained by Swan river, would take in all that was contemplated by my instructions. A detailed description of these townships is entered in the field notes.

Swan river rises among the hills about thirty miles to the south and flows northerly between high ranges of hills, to the south boundary of township 72, range 9 in section 5, where the country becomes almost level. About half a mile north of this point. Swan creek, a branch of the river, joins the main stream, flowing from the southeast among the hills, which it appears to cut in two. About at right angles to this stream a range of hills extends northeasterly towards the lake. These hills as seen from the distance appear to be heavily timbered with poplar and spruce. The range of hills continues west of Swan river for at least six ranges, and through them at intervals, various streams flow into the lake, forming points at their outlet. This action has apparently been going on for ages, and has formed these lower levels of alluvial lands such as are seen at the mouth of the Swan and Driftpile rivers. What is known as the Swan river prairie extends northerly from Swan creek in section 8, township 72, range 9 on both sides of Swan river from a half mile to a mile in width into section 6, township 74, range 9. At the time of survey there were six settlers, with improvements at different points on the river. Small patches of prairie are found through the earlier surveyed lands, and the timber is chiefly light poplar and willow. Large meadows suitable for grazing purposes are found on the west half of townships 73 and 74, range 10, but they are at present too rough and have too much brush on them for hay making, but they can be easily cleared and drained.

Railway facilities will make the Swan river country one of the most favoured settlements of the West. Its close proximity to mining prospects, considerable areas of spruce and poplar, good soil, plenty of fuel, good water and excellent climate caused by the almost universal east or west winds, leads one to this optimistic view. Mixed farming will be the most productive of good results here as in all other portions of the West, where frost is liable to occur.

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In addition to the road following the lake shore mentioned before, there is a very good wagon road from the north end of township 74, range 10, to Swan creek and a few settlers cut a wagon trail over the hills from the Athabaska river to this road this season.

The next work to be done was to run the east outlines of townships 73, ranges 12 and 13, to ascertain the quality of the soil and where the valuable timber areas were, together with the possibility of the land being required for immediate settlement.

Townships 73, ranges 11, 12 and 13, are quite rolling, with a descent from the south towards the lake. The highest parts are heavily timbered with poplar and scattered spruce and have a stony clay soil, while those near the lake shore, except along the banks of Driftpile river and the greater part of the Indian reserve, are composed of swamp and muskeg, covered with small spruce and willow, and adjoining the south-east boundaries of the Indian reserve, are especially very wet, while only for short periods and in occasional seasons can stock graze on these lands. What is known as the Driftpile Indian reserve in the north end of township 73, range 12, is laid out along the banks of Driftpile river, and contains some of the best land on the south shore of the lake. This is occupied by a few Indians who live chiefly on fish and game, only two or three making any attempt to grow anything for themselves or their stock. I would not advise the subdivision of these lands adjacent to the Indian reserve for the present, as there is not enough of good farming land to make a settlement.

Broken township 74, range 13 was subdivided as it is on one of the few portions of the Lesser Slave lake shore where there is water deep enough for steamboats to land. It was thought also that when a railway is built that this would be an objective point on the lake and an important station on the railway. One stone building had been built before survey was made. These surveys completed all that was thought necessary at present to be done here, so on October 8, I took my outfit by steamer to the east end of the lake where the village of Sawridge has begun to grow. At present it consists of two stores, livery barn, postoffice, stopping places, church and a few log houses. Around this village I subdivided the south two-thirds of township 73, range 5, and small portions of townships 72, ranges 5 and 6, two sections of township 73, range 6 and four sections of township 73, range 4. Throughout this territory there are small prairie spots, on some of which settlers have begun to make improvements. Adjoining the northwest corner of this surveyed land in township 73, range 5 there is a nice bunch of spruce timber of probably two or three million feet. This land should not be subdivided at present. Having stored the transport outfit in care of the Mounted Police at the east end of Lesser Slave lake on November 28, the ice being good on the river, we started for Edmonton, but on account of the wing dam being built to hold the water back we left the ice at Moose river and travelled overland to Athabaska river. This was frozen over except a channel of two hundred feet which was running full of ice. There was nothing for it but to build a raft; as timber could be got about half a mile away, we went to work and by three o'clock in the afternoon we had three teams sleighs and baggage across. If we had gone over the road on the east side of the river to Athabaska Landing, we should have been blocked from crossing for several days for the ferry had been hauled up out of the river. We arrived at Edmonton on December 5, where I paid off the party, and after attending to necessary details left for home on the 19th.

In conclusion, I wish to record my appreciation of the services of my assistant Mr. W. A. Scott, and the other members of my party who always performed their work with willingness, cheerfulness and diligence.

I have the honour to be, Sir,  
Your obedient servant,

HENRY W. SELBY, D.L.S.

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## APPENDIX No. 44.

## REPORT OF A. C. TALBOT, D.L.S.

SURVEYS AT LAKE LOUISE AND LAKE MINNEWANKA.

CALGARY, ALTA., November 12, 1908.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on the work done by me, during the months of August and September last at lake Minnewanka and lake Louise.

In compliance with your instructions of June and July, I communicated with Mr. H. Douglas, Commissioner of Dominion Parks and met him by appointment, at Banff, on July 7, to find what surveys were required at Minnewanka and at lake Louise. I went over the ground with him at Minnewanka, where after a careful examination of the place we decided to ask you for the cancellation of part of the old survey, to give us a free hand to make a new survey of villa lots, more suited to the nature of the ground.

Having received final instructions on August 8, I left Calgary on the 12th and arrived at Minnewanka the following day. I was there for eight working days of which about five only were employed on the Minnewanka survey.

I took upon myself to give a day's work to an official of the Department of Marine and Fisheries to find levels from a small lake near Minnewanka, (used as a fish nursery), to a point on Devil creek. I suggested writing to the Department for authority to do the work, but there was no time for that as the work was wanted immediately, and there was no one else to do it.

I had an accident with my transit on the morning of the 20th, and had to express it to Winnipeg for repairs. I went down to Calgary for another one to continue the survey.

The work was completed at Minnewanka on August 22 and I left immediately for lake Louise, where I arrived during the evening of the same day.

I started work on the Laggan and lake Louise survey, by locating the old surveyed line, east boundary of section 32, township 28, range, 16, west of the fifth meridian and re-opening part of it; I then produced it south, to the northeast corner of section 20, thence west, along the north boundary of section 20, to the northwest corner.

When the section lines had been surveyed far enough to locate the Canadian Pacific railway chalet and other buildings at the lake, I asked Mr. Douglas, Commissioner of Dominion Parks, to come to the lake to give his opinion as to where the road should be surveyed near the chalet and the frontage to be allowed to the Canadian Pacific Railway company.

As the company had already spent a large sum of money improving the ground in front of the chalet, filling up and terracing, and was opposed to the opening of a public road there, Mr. Douglas agreed to have it surveyed on the face of the hill, back of the chalet. When this had been surveyed, I found that the turn in the road, near the villa lots came too close to the chalet and would interfere with the proposed building of an addition, one hundred and seventy-five feet long to the west of the present building, Mr. Hayter Reed, representing the Canadian Pacific Railway

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company, who happened to come to the lake at that time, objected very strongly to the piece of road near the villa lots and also to the piece between the buildings back of the chalet, although it had been accepted by Mr. P. J. O'Leary, another official of the company, who had discussed the matter with Mr. Douglas.

I thought Mr. Reed's objections were justified, because, if the public has to go back of the chalet to reach the west shore of the lake, it matters very little whether the road is back of all the buildings or through them as at first proposed, but it is quite different with the owners of these buildings. For these reasons I made an examination of the place, and having found just as good ground, if not better, to build a road, back of the buildings, I decided to make the change. I would have preferred to consult Mr. Douglas before doing so, but he was absent from Banff at the time and I could not wait for his return.

At the request of Mr. Douglas I surveyed a block of six villa lots, on the lake shore west of the Canadian Pacific railway grounds and another block of seven lots east of Louise creek. The belt of land between the surveyed road and the north boundary of section 20 was also surveyed in larger lots, as I was informed that part of this would be leased in the near future.

The railway company, having some work along Louise creek and a power house for their electric plant, in the southwest corner of section 28, wanted to secure that corner of the section, so I surveyed ten acres for that purpose.

The west end of the north boundary of section 19, was over very rough ground and as I had already a good check on the survey made, I decided not to open that line. Another reason was that the work had taken more time than was expected and I did not want to prolong it more than was absolutely necessary.

## GENERAL INFORMATION.

Forest fires have killed a large quantity of timber along the valley of Bow river. Opposite Laggan these fires ran about half way to lake Louise, some years ago; this track is now covered with a new growth of pine, with a large quantity of the dead timber standing up, sound and clear of bark. From the burned belt south, up to a height of about 1,500 feet above the valley of the river, there is a belt of good green timber, principally spruce, pine and fir; trees are generally very tall but not of large diameter, a few only being over eighteen inches.

The soil between lake Louise and Bow river is mostly of glacial formation, composed of boulders of all sizes mixed with coarse sand and gravel. It was impossible to plant posts in most places and the digging of pits was out of the question, even in open places; the only way of marking corners in a permanent manner was to build a stone mound around the post to hold it in place.

The weather was very wet part of the time I was at lake Louise and the progress of my survey was consequently retarded. Another cause of delay, was the small number of labourers at my service to do the bush work, five at the most, and of these, two only were fairly good axemen.

The survey at lake Louise was completed on September 18, and I returned to Calgary on the following day.

I have the honour to be, sir,

Your obedient servant,

A. C. TALBOT, D.L.S.

## APPENDIX No. 45.

## REPORT OF W. THIBAUDEAU, C.E.

## INVESTIGATION OF WATER-POWERS ON STREAMS IN SOUTHWESTERN ALBERTA.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

OTTAWA, April 30, 1909.

SIR,—I have the honour to submit the following report of my field operations during the past season, under your instructions, dated July 11, 1908, to investigate the water-powers on the rivers flowing from the eastern slope of the Rocky mountains in Southern Alberta.

I left Ottawa on July 16 and proceeded to Calgary, where I interviewed Mr. Stewart, Commissioner, at the Canadian Irrigation Survey office, with the object of securing data *re* the flow of water in the various rivers which I contemplated investigating. Having secured certain data, I made the following preliminary exploration:—

1. St. Mary river, from its mouth to the international boundary, approximately one hundred and ten miles.
2. Belly river, from its confluence with St. Mary river to the international boundary, approximately ninety miles.
3. Waterton river, from its confluence with Belly river to the international boundary, approximately sixty miles.
4. Lee creek, a tributary of St. Mary river, from its confluence to about seven miles up stream.
5. Tib creek, a tributary of Belly river, from its confluence to about five miles up stream, or about one mile above the forks.
6. Blakiston brook (Pass creek), a tributary of Waterton river, from its mouth to about five miles up stream.
7. Oil creek, a tributary of Waterton river, from its mouth to about two and one-half miles up stream.
8. Pincher creek, a tributary of Oldman river, from its mouth to about two miles above Pincher Creek townsite, a distance of seven miles.
9. Mill creek, a tributary of Southfork river, from its mouth to about three miles up stream.
10. Southfork river, from Mill creek to about two miles above the forks on both branches, or about eight miles.
11. Crowsnest river, from Cowley to Coleman, or about twenty-three miles.
12. Gold creek, tributary to Southfork river, from its mouth to Lille, about five miles.
13. Blairmore creek, from its mouth to about two and one-half miles up.
14. Oldman river, from Southfork river to its head, about twenty-five miles.
15. Livingstone river and tributaries, about eighteen miles.

Total mileage explored on rivers and creeks, three hundred and sixty-nine miles.

The above explorations, not including Oldman river, Livingstone creek and tributaries, were finished on September 1. I then proceeded with hydro-topographic surveys of the locations which I thought would be of some value for water-power, as follows:—

1. St. Mary river, from the intake of the Alberta irrigation canal, about three and one-half miles to the head of the canyon in sections 25 and 23, township 1, range 25, west of the fourth meridian.
2. St. Mary river, from the northwest quarter of section 24 to the southwest quarter of section 10, township 6, range 23, west of the fourth meridian.



## SESSIONAL PAPER No. 25b

3. Lee creek, from the southeast quarter of section 35, township 2, range 26, west of the fourth meridian, to Cardston.

4. Tib creek (or north fork of Belly river), from its mouth to the forks, situated in the Blood Indian reserve timber limit.

5. Waterton lake, the narrows.

6. Oil creek, from its mouth (Waterton lake) to about one mile up.

7. Blackiston brook, from Waterton lake to about four miles up through section 6, township 2, range 29, and sections 1, 2, 3, 4 and 5, township 2, range 30, west of the fourth meridian.

8. Southfork river, from the southeast quarter of section 24 and the northeast quarter of section 13, township 6, range 2, west of the fifth meridian.

9. Crowsnest river, in the northeast quarter of section 21, township 7, range 2, west of the fifth meridian.

In the working of these surveys and explorations it was necessary to haul the outfit about nine hundred miles; only in a few places was difficulty experienced in getting through.

On November 2, having accomplished most of the work contemplated and the weather being very severe, I stopped field operations.

On November 20, I resumed field work and explored Oldman and Livingstone rivers and their tributaries. I also secured some more information from the Commissioner of Irrigation at Calgary, as to gauge readings, etc., observed during the past summer.

The flood last summer was unusually high, the season of low water was longer, and the water was lower than usual. The earlier part of the season was hot and dry, and during the remainder the weather was variable. In the middle of September there was a snowfall of one foot, and from that time until my field operations ceased there were few days of fine weather.

The instruments used in the hydro-topographical survey were a four-inch Watt's theodolite, Surveyor General's model, a strong, compact, light, accurate and handy instrument; an eighteen-inch Stanley dumpy level, well finished, having a powerful telescope, and of great precision; a stadia rod; a Keuffel and Esser stadia sliding rule; a four-chain steel tape; a four-inch Watt's aneroid; an Abney hand level, and a prismatic compass. The last three named instruments were principally used for reconnaissance. The Stanley dumpy level was used principally to ascertain the difference of elevation between the proposed mill site and intake.

Distances and elevations in general in the topographical work and of traverses were measured with the theodolite and stadia rod and reduced with the slide rule.

Where the theodolite was used instead of the level to find the elevation from one station to another, I have used the following table of allowance to be added for curvature of the earth and refraction combined:

Distance in feet.	Allowance in feet.
600 ft. . . . .	.007
900 ft. . . . .	.017
1,200 ft. . . . .	.030
1,500 ft. . . . .	.046
1,800 ft. . . . .	.066
2,100 ft. . . . .	.090
2,400 ft. . . . .	.116

All the surveys of water-powers were connected with some section monuments (with one exception). I may state, in many places through the ranching country in southern Alberta, posts are missing. It is customary for cowboys and others to pull up the survey posts and use them to stake their horses.

With the exception of Tib creek all the levelling was connected with some bench marks of the Canadian irrigation survey or the Canadian Pacific railway.



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## GAUGING THE VELOCITIES OF STREAMS BY MEANS OF A CURRENT METER.

My first operation in making a careful gauging of the velocity by means of a current meter was to choose a good station. The aim has been to find some point on the course of a stream where its bed and banks are nearly permanent, the current of moderate velocity, and the cross-section area uniform for about two hundred feet above and below the gauging station. At this point a standard steel tape was stretched across the stream at right angles with the general direction of the current and a tag mark placed every ten feet. To ascertain the depth a gauging rod was made with a pole on which was tacked a flexible rod divided in feet and tenths. All the measurements were made by wading.

*Current Meter.*

The current meter used was Gurley's new model No. 617. It has several new features in the way of improvements. This meter was tested by the Assistant Hydrographer of the United States Geological survey and was found very satisfactory. He has furnished a rating table for S. P. Patents, new model, the new meter rating satisfactorily with it. In this meter a contact device has been arranged so that each fifth revolution instead of each single revolution of the wheel is indicated. The meter is equipped with a cable and a wet cell telephone attachment.

In using the meter, the time taken for a certain number of revolutions is observed instead of the number of revolutions for a given time. This increases the accuracy of the work and also the ease with which the observation may be taken. In taking the time a stop watch was used.

The meter rating table has been made to give the velocity corresponding to the number of seconds which it takes to make a given number of revolutions. As the streams measured were shallow, the mean velocity in a vertical line was determined by holding the meter at six-tenths depth, instead of holding the meter at two-tenths and eight-tenths depth, which is the usual method. The mean of the two results is considered more accurate than a single reading at six-tenths depth.

Two or three measurements made at the same place, the local conditions being the same, has shown a maximum variation of one and one-half per cent.

The following summary shows upon what I have based my estimate of cost of plants on the locations selected by me as suitable ones for generating power and of which I have made a hydro-topographical survey. The summary for each location will contain the drainage area, the average rainfall and run off, the character of the drainage area, &c., and any other data at my disposal secured from the Canadian Irrigation Survey branch.

There were three places, one in section 24, one in section 25, township 6, range 23, west of the fourth meridian on the St. Mary river where water-power could be developed by means of a tunnel; also one on Belly river. Although no external surveys were made, from the data I have I believe about five hundred feet of tunnel on the two former would develop 780 horse-power and 650 horse-power respectively. The one on Belly river would give 1,200 horse-power on section 33, township 8, range 24. Unfortunately I discovered the feasibility of these powers only on my return and they have not been thoroughly investigated. These mill sites would be handy to Lethbridge.

## UPPER ST. MARY RIVER.

Estimate of cost of hydro-electric plant for 10,200 horse-power proposed to be erected in the northwest quarter of section 23, township 1, range 25, west of the fourth meridian.

*Annual report of the Topographical Surveys Branch, 1908-1909.  
To accompany report of W. Thibaudeau, C.E.*

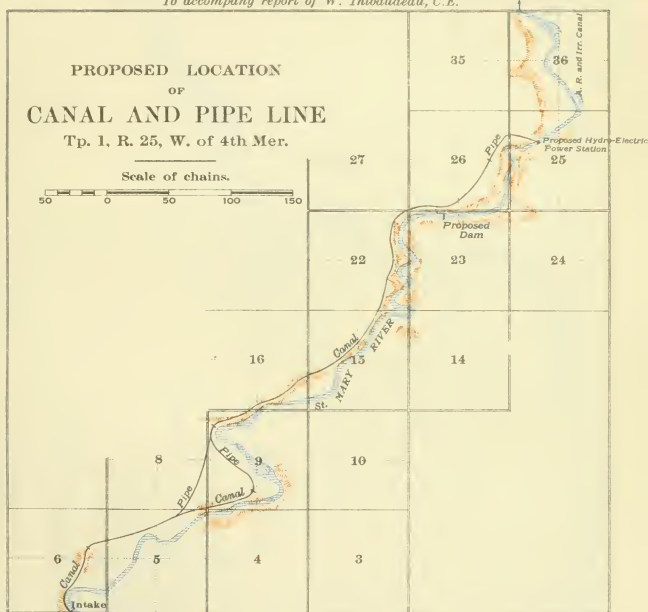
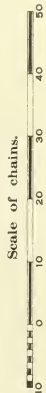


PHOTO-ZINCGRAPHED AT THE SURVEYOR GENERAL'S OFFICE OTTAWA CANADA



# PROPOSED LOCATION OF CANAL AND PIPE LINES AND PROPOSED DAM

Tp. 1, R. 25, W. of 4th Mer.



NOTE.—Traverse lines are shown in red  
Contour elevations are in feet.

Sec. 26

Sec. 25

Sec. 23

Sec. 24





SESSIONAL PAPER No. 25b

*Topographical Description.*

The upper St. Mary river valley which is well defined, consisting of rolling slopes, (open prairie with no timber) and some cut banks, is half a mile wide; the river cuts through it at an average depth of one hundred and forty feet. The water is clear, cold and free from silt. From the southeast quarter of section 23 to the northwest corner of section 25, the valley takes the form of a canyon which averages one hundred and fifty feet in depth. The bottom is of solid sandstone and limestone, visible nearly everywhere. The banks consist of alternate layers of sandstone, limestone and hard clay. The upper part of the river valley to the international boundary consists alternately of flats and cut banks fifty to one hundred feet in depth.

The strike is northeast and southwest, the dip is about five and a half degrees southerly.

The drainage conditions are favourable for a quick run off.

The river carries no drift wood and the most favourable location for a dam is in northwest quarter of section 25, township 1, range 25. The surrounding country is well adapted for wheat raising; last season the crop was good and did not require irrigation. In a few places there are croppings of good coal.

*Survey.*

The survey of the water-power was connected with the quarter section monument on the east boundary of section 6, township 1, range 25.

Levels were connected with the Canadian Irrigation survey sill of intake of the Alberta Railway and Irrigation company's canal, elevation 3,854 feet.

The lands to be reserved for mill sites are the northwest quarter of section 25 and the south half of the southeast quarter of section 26 and the west half of the northwest quarter of section 23, township 1, range 25.

*Drainage Basin.*

The drainage basin of St. Mary river south of the boundary line is three hundred and ninety-five square miles, bounded to the south by the continental divide. At the proposed dam and mill site locations the drainage area is four hundred and fifty square miles.

*Maximum and Minimum Flow of Water.*

From the available records at my disposal I found that the seasons of minimum flow (about five hundred and twenty foot seconds) appear to be between April 10 to 16 and September 1 to 20.

Last year high water at flood level was reached between June 1 and 14, and it is estimated that on June 5 the flow was 16,000 foot seconds, which was the highest in years, the gauging station at Kimball recording 11 feet.

*Gauging.*

## CANADIAN IRRIGATION SURVEY.

September 1, 1906 near Kimball.. . . .	5,081	foot seconds.
August 3, 1907.. . . .	2,026	" "
June 29, 1908.. . . .	2,836	" "
September 1, 1908.. . . .	519	" "
September 16, 1908.. . . .	519.8	" "

Note by the Surveyor General.—Mr. Thibaudeau was directed by his instructions to investigate water-powers. In order to make the investigation more complete he has in every case furnished estimates for the establishment of a hydro-electric plant. The cost of developing the water-power alone can be found by leaving out of the estimate the items relating to the electric plant.

*Location of Dam.*

The proposed dam is situated about twenty miles from Cardston station; the roads in that locality are fair. Freight rates from Cardston to the mill-site would be about \$4 per ton.

*Estimated Cost of a Masonry Dam.*

Height of dam, 140 feet.

Length of dam, bottom, 250 feet.

Length of dam, top, 570 feet.

Assuming that the ground would have to be excavated to a depth of ten feet at the side and bottom, the cubic contents would be 150,000 cubic yards; estimating this at \$6 per cubic yard, the cost would be \$900,000.

Cost of dam.. . . .	\$ 900,000
Cost of wheel plant.. . . .	612,000
Cost of electric plant.. . . .	255,000

---

Total cost of plant.. . . . \$1,767,000

Cost per horse-power in bringing water to turbine.. . . .	\$ 88 23
Cost of wheel plant per horse-power.. . . .	60 00
Cost of electric plant per horse-power.. . . .	25 00

---

Total cost per horse-power in developing plant.. . . . \$173 23

Placing depreciation on whole plant at . . . . .	2 per cent.
Repairs.. . . .	1 "
Interest.. . . .	6 "
Taxes and insurance.. . . .	1 "

---

Total.. . . . 10 "

*Cost of Operation.*

Fixed expenses per horse-power, \$173.23 at 10 per cent..	\$17 32
Running expenses per horse-power.. . . .	2 00

---

Total cost per horse-power per annum (24 hour day).. \$19 32

Further investigation has shown that a more economical way of developing power would be to carry the water from the international boundary by means of canal and pipes to a point in the northwest quarter of section 25, township 1, range 25, west of the fourth meridian above the intake of the Alberta Irrigation canal and the cable gauging station.

The elevation at the international boundary line is 4,136 feet; at the point where I propose to erect a power plant the elevation is 3,862, a difference in elevation of 274 feet. The distance by the river is nine and three-quarter miles, which gives an average fall of about twenty-eight feet per mile. It would require about seven miles of canal, bottom sixteen feet, slopes 2-1, area 188 square feet, depth of water 6.5 feet, height of bank 10 feet, grade per mile 1.6 feet, velocity 3.0 feet per second, volume of water 564 foot seconds. This canal would require the excavation of 36,700 cubic yards per mile; at 50 cents per cubic yard the cost would be \$18,350. Total cost for 7 miles, \$128,450.

The Canadian Pacific railway, in their irrigation scheme for earth excavation, pay from fifteen to sixteen cents per cubic yard; for loose rock, thirty to thirty-five

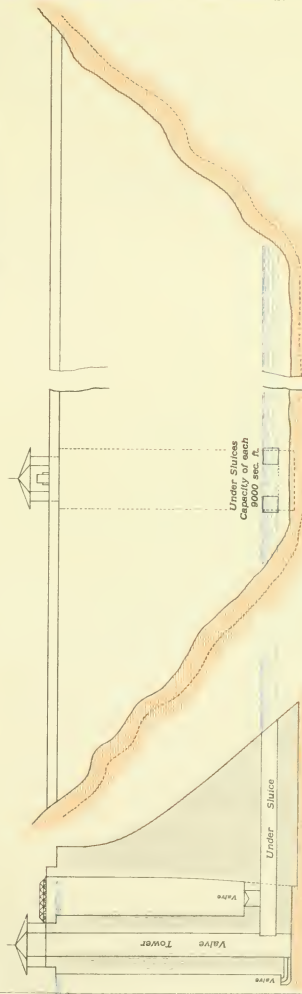
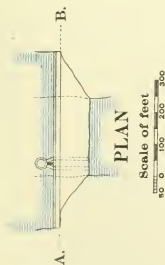
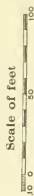






# PRACTICAL DIAGRAM FOR PROPOSED MASONRY DAM ON ST. MARY RIVER

Tp. 1, R. 26, W. of 4th Mer.



Cross Section of River at AB.

Section of Dam through centre of Valve Tower



## SESSIONAL PAPER No. 25b

cents per cubic yard, and for solid rock, one dollar per cubic yard. The fifty cents per cubic yard makes allowance for loose rock and solid rock which may occur in the excavation, although not apparent.

Construction material (except stone and lime) would have to be hauled from Cardston.

*Pipe.*

I propose to carry the water from the canal by four stave pipes six feet in diameter, factor of safety 4, grade nine feet per mile, giving a velocity of five feet per second or a flow of 565 foot seconds.

At no point will the pressure on the pipes be more than fifty feet head, except near the power house where steel pipe will have to be used.

*Estimate of Cost of Canal and Pipes.*

Timber.. . . .	\$2 26	per lineal foot.
Iron.. . . .	3 00	"
	<hr/>	
	\$5 26	"
Preparing ground.. . . .	0 30	"
Cost per mile.. . . .	\$ 29,356 80	for 1 pipe.
" " " " " " " "	117,427 20	" 4 "
Three miles of four pipes.. . . .	352,281 60	

Total cost of canal and pipes.. . . \$480,731 60

I am confident that in the final location of the pipe line the distance will be shortened enough to cover the increased cost of steel pipe.

*Estimated Horse-power.*

From two hundred and seventy-four feet difference of elevation between the international boundary and the proposed mill site, deducting the grade for seven miles of canal and three miles of pipe (thirty-six feet) there remains an effective head of two hundred and thirty-eight feet with an average of 565 foot seconds giving 14,933 horse-power.

*Estimated Cost of Plant.**Intake.*

Masonry, 850 cubic yards at \$6.. . . .	\$5,100	
Timber, 26,000 feet B.M. at \$33.. . . .	858	
	<hr/>	
		\$ 5,958
Canal and pipes.. . . .		480,731
Wheel plant.. . . .		895,960
Electrical equipment.. . . .		373,325
	<hr/>	
Total cost.. . . .	\$1,755,974	
Cost per horse-power in bringing water to turbine.. . . .	\$ 32 60	
" " wheel plant.. . . .	60 00	
" " electrical equipment .. . . .	25 00	
	<hr/>	
Total cost per horse-power.. . . .	\$117 60	

*Cost of Operation.*

	Per cent.
Placing depreciation on whole plant at . . . . .	2
Repairs . . . . .	1
Interest . . . . .	6
Taxes and insurance . . . . .	1
Total . . . . .	10
Fixed expenses per H.P. \$117.60, at 10 per cent..	\$11 76
Running expenses.. . . .	2 00
Total cost per H.P. per annum (of 24-hr. day) . . . .	\$13 76

*Comparison of Cost.*

First Development Plant.—Cost per horse-power, including dam, wheel plant and electrical equipment, \$173.23.

Second Development Plant.—Cost per horse-power, including intake canal, pipe line, wheel plant and electrical equipment, \$117.60.

Another advantage of the second plant is that it might be started by building only one stave pipe and canal, others being added as the demand required, thus making the initial cost for one pipe about \$538,846, giving 3,744 horse-power.

The main transmission line should go direct from the power house to Lethbridge, a distance of forty-five miles, then to Macleod, sixty-nine miles. Small progressive towns such as Cardston, Magrath, Sterling and Raymond (the latter has a large sugar beet factory, where a large amount of power would be utilized), could be supplied from the main transmission line.

These towns would be the principal fields of operation for a company which would build on the upper St. Mary river, as at present the only available source of power is steam.

This location for a large hydro-electric plant is one of the best and cheapest to be found on the eastern slope of the Rocky mountains, south of Calgary.

LOWER ST. MARY RIVER.

In the southwest quarter of section 24, township 6, range 23, west of the fourth meridian, I found a good location for a dam about ninety feet in height, situated about sixteen miles southerly from Lethbridge.

On the eastern side of the river there is an almost perpendicular wall of solid sandstone formation. The river bottom is of solid rock formation visible nearly everywhere. On the western side the bank slopes at an angle of about 40°; the formation is sandstone partly covered with a thin layer of gravel and loam; the bedding of the country rock lies horizontal. The conditions looked so favourable for the development of water-power that I made a topographical survey of the site. The flow of water was found on gauging to be about three hundred foot seconds.

Under ordinary conditions during the irrigation season, no greater quantity of water could be depended upon as the Alberta Irrigation company have secured the right to use 500 foot seconds for irrigation purposes, and there is no tributary of any importance from the intake of the above company to this point; Lee creek, the most important, discharges between eleven and sixteen foot seconds in ordinary seasons.

The drainage area of the river at this point is 1,010 square miles, the greater part of which consists of open, sloping and rolling country; the soil is a rich loam producing fine crops of wheat and other grain; there are also some croppings of good coal in the vicinity.

## SESSIONAL PAPER No. 25b

I noticed in some parts of the canyon that the high water mark at flood level had reached a height of twenty-five feet above the ordinary level. At those points a cross-section of the river would give about 4,500 square feet. At the time, this did not cause me much worry on account of the reports of the Canadian irrigation surveys giving the flow of high water at flood level to be about 7,000 or 8,000 foot seconds. On my return to Ottawa, I obtained from the Commissioner of Irrigation at Calgary gauge readings of high water at flood level, taken at Kimball during the past season, also some gauging from which I have deduced the probable flow of the river at high water to be in excess of 30,000 foot seconds. It must be remembered that the drainage area at this point is more than double of what it is on the upper St. Mary river, where it was found that the flow of water at flood level exceeded 16,000 foot seconds; the conditions at this point are most favourable for a quick run off after a heavy rain.

With a dam ninety feet high under ordinary conditions an average of 2,060 H. P. could be depended upon; but I believe it would not be practical on account of the possibility of a flood like last season, when it would have required a weir eight hundred feet long with a depth of six feet of water over the crest. The cost would be about \$650.00 per H. P. which would be prohibitive.

## ST. MARY RIVER.

*Gauging made September 20, 1908.*

*Gurley Meter No. 617.*

*Discharge 305 foot seconds.*

SOUNDING.		Depth of Observation.	Revolution.	Second.	
Distance from zero point.	Depth.				
1	.....	1½	.....	.....	Mean velocity 758 feet per second.
3	0.73	.....	.....	.....	
10	1.92	.....	5	33.4	
20	1.82	.....	20	57.6	
30	1.85	.....	20	30.0	
40	2.40	.....	35	45.4	
50	2.64	.....	30	38.8	
60	3.18	.....	40	52.6	
70	2.75	.....	30	37.8	
80	3.64	.....	20	46.2	Gauged in southwest quarter of section 24, township 6, range 22, west of the fourth meridian.
90	2.40	.....	20	66.4	
100	0.64	.....	5	40.8	
104	0.00	.....	0	.....	

## LEE CREEK.

Estimate of cost of a small hydro-electric plant for 172 horse-power proposed to be erected at Cardston, Alberta.

*Topographical Description.*

1. Lee creek a tributary of St. Mary river, at certain seasons is a regular torrent; it receives its supply principally from the precipitation of the northern slope of Chief



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mountain. Its general direction is northeast and southwest. The area of its drainage basin is 133 square miles, one-third of which is south of the international boundary.

From Cardston to the proposed intake location in the southeast quarter of section 35, township 2, range 26, west of the fourth meridian, at the foot of what they call 'the canyon,' the creek winds its tortuous course through a narrow valley, averaging half a mile in width, which is surrounded by steep hills. There are sandstone cut banks in places; the balance consists of gravel or loam, which is under cultivation, the country rock lies horizontal.

At the end of July, when I explored the creek, the water was clear and cold, with a flow of twenty foot seconds. The drainage basin, being open and rolling, is favourable to a quick run off.

Last summer at high water the flood stage was very large, carrying away houses in many places and one bridge. The minimum flow is about twelve foot seconds, and occurs in April and September.

The creek elevation at the power house (B.M. power house floor 3,666 feet) is 3,686 feet, and at the intake it is 3,855, a difference in elevation of 169 feet.

The water from the intake to Cardston would be carried in a stave pipe, twenty-seven inches diameter, four miles long, grade 10.5 feet per mile, velocity four feet per second, flow sixteen foot seconds. Deducting grade of pipe (forty-two feet), there remains an effective head at Cardston of one hundred and twenty-seven feet.

If the water is to be used for waterworks, this would give a pressure of fifty-five pounds per square inch, and would supply a population of 2,500 people; at present steam is the only source of power.

The minimum flow (twelve foot seconds), with one hundred and twenty-seven feet head, will generate 172 horse-power. The minimum flow was deduced from gauging made by the Canadian irrigation surveys extending over a period of years.

#### *Survey.*

The survey of the dam site was connected with the southeast corner of section 26, township 2, range 26.

The levels were connected with the Canadian irrigation survey, bench mark '49,' elevation 3,793 feet.

The lands to be reserved for a dam site are the southwest quarter of the southwest quarter of section 36 and the southeast quarter of the southeast quarter of section 35, township 2, range 26.

#### *Estimated Cost of Plant.*

##### *Intake—*

Masonry, 120 cubic yards at \$6.. . . .	\$ 720 00
Timber, 14,000 feet B.M. at \$35.. . . .	490 00

Total.. . . .	\$1,210 00
---------------	------------

Four miles pipe at \$1.90 per lineal foot, or \$10,032 per mile.. . . .	\$ 40,128 00
---	--------------

Excavation to cover pipe, 7,000 cubic yards at 50c..	3,500 00
--	----------

Wheel equipment.. . . .	8,600 00
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Electrical equipment.. . . .	5,160 00
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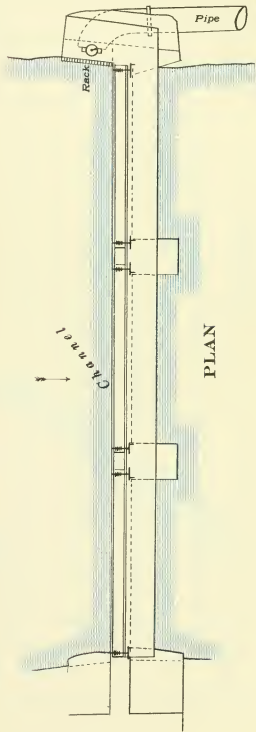
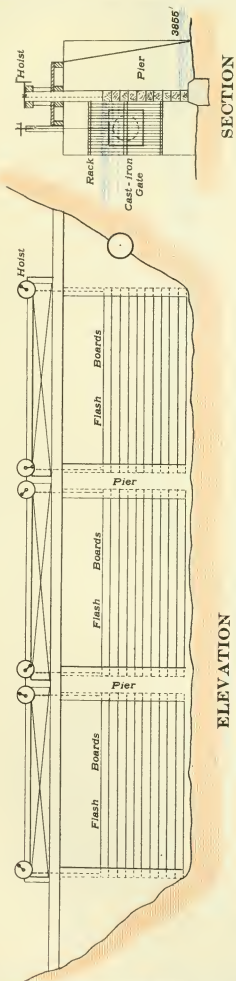
Total cost.. . . .	\$58,598 00
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Cost per horse-power in bringing water to turbine . . . .	\$260 68
---	----------

Cost per horse-power, wheel plant . . . . .	50 00
---	-------

Cost per horse-power, electrical equipment . . . . .	30 00
--	-------

Total cost per horse-power . . . . .	340 68
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# INTAKE LEE CREEK

Scale of feet.





Sec. 35

Sec. 36

Sec. 26

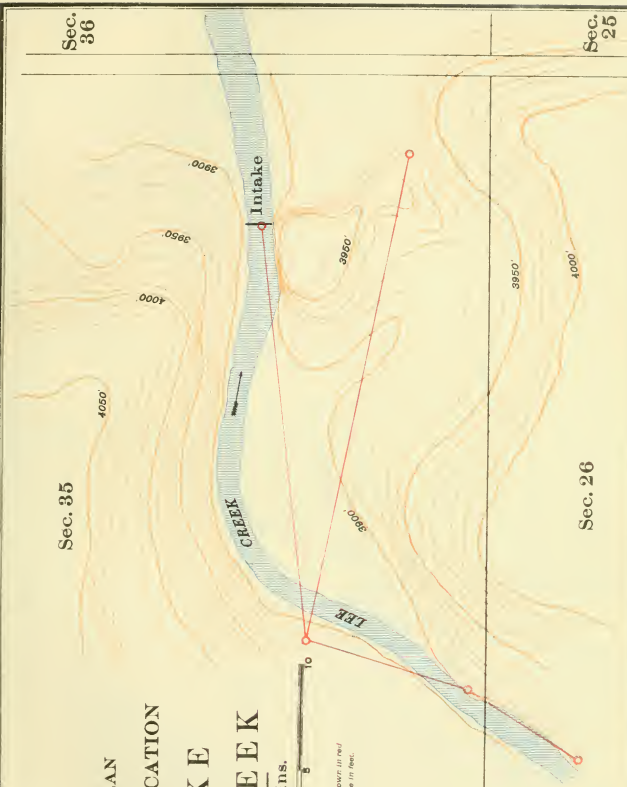
Sec. 25

DETAIL PLAN  
OF  
PROPOSED LOCATION  
OF  
INTAKE  
ON  
LEE CREEK

Scale of chains.



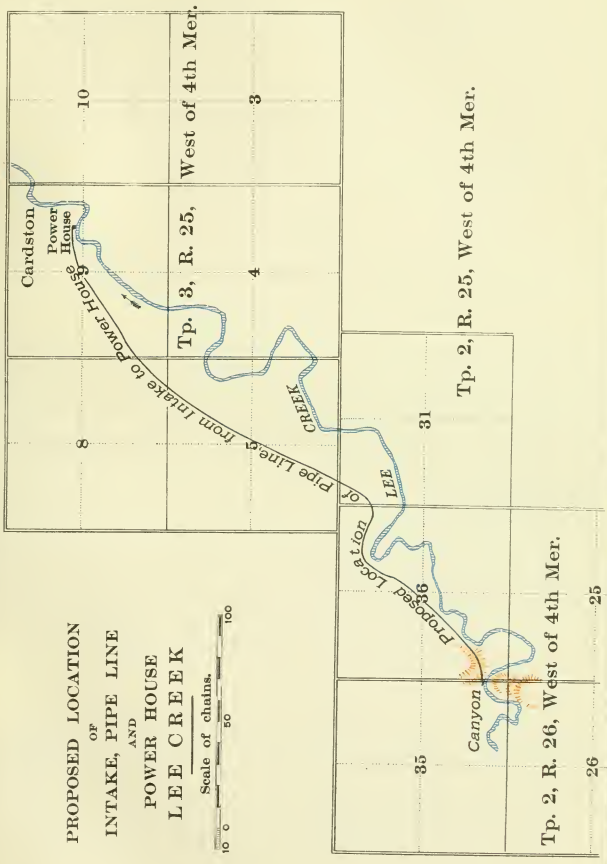
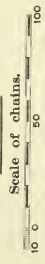
NOTE.—Transverse lines are shown in red  
Contour elevations are in feet.





INDIAN RESERVE

PROPOSED LOCATION  
OF  
INTAKE, PIPE LINE  
AND  
POWER HOUSE  
LEE CREEK







## SESSIONAL PAPER No. 25b

*Cost of operation*

	Per cent.
Placing depreciation of whole plant at. . . . .	2
Repairs. . . . .	1
Interest. . . . .	6
Taxes and insurance. . . . .	1
Total. . . . .	10
Fixed expenses per H.P., \$34.063 at 10 per cent. . . . .	\$34 01
Running expenses. . . . .	2 00
Total cost per H.P. per annum (for 24-hr. day). . . . .	\$36 01

## TIB CREEK.

Estimated cost of a hydro-electric power plant for 1,364 horse-power proposed to be erected on Tib creek in the Blood Indian timber reserve.

*Topographical Description.*

Tib creek is a tributary of Belly river, which it joins about two and one-half miles north of the international boundary. It receives its water supply from the snow melting on the surrounding peaks; its valley is narrow, varying from one-third to one-half mile in width; it runs in a southwesterly direction, rising south of the international boundary. The right limit of the creek follows the foothill closely, while the left side consists of benches, covered with timber in the valley. The country rock is overlaid with gravel and loam.

Some places along the creek are canyon like, consisting partly of sliding material. On the left limit there are a couple of canyons cutting through the benches. Pipes would have to be carried across the canyons by means of trusses about sixty feet in length. From the foothills the valley and sidehills are partly timbered with spruce and pine of some commercial value. About half a mile down stream from the proposed intake there is a rock cropping of sulphate of lime (gypsum), which I believe might prove of some commercial value as plaster of paris. The creek at flood level is a regular torrent and carries some driftwood. As the benches are very irregular and swampy in places the water from the intake to the wheel plant would have to be carried through pipes. The water is clear and cold. On account of its high altitude the country in this vicinity is better adapted for grazing than farming.

*Survey.*

The survey was connected with the international boundary at its intersection with Belly river on the right bank. The levels were connected at the same place, the elevation at that point deduced from interpolation from data on both sides of the international boundary.

The lands to be reserved for mill site contain one hundred and sixty acres, the west boundary being ten chains west of the location of the mill site, the north and south boundaries twenty chains each from the same point.

*Drainage Basin.*

The drainage basin of the creek is about forty square miles, twenty-five square miles of which is south of the international boundary.

*Minimum Flow.*

August 22, 1908, I estimated the flow to be about forty-five foot seconds.

October 23, 1908, gauging gave flow at fifty foot seconds. On account of the country being timbered in the valley and containing many snow peaks I consider the minimum flow to be about thirty-five foot seconds; no data being available, comparing the drainage basin of this creek with Waterton river, which is similar, my estimate would be on the safe side.

*Location of Power Plant.*

The proposed power plant is situated in the Blood Indian timber reserve at the foothill about seventeen miles from Cardston; the roads are fair.

Freight rate from Cardston would be about \$6 per ton.

*Estimate of Cost of Pipe Line.*

It would require four miles of stave pipe thirty-six inches in diameter, grade sixteen feet per mile, velocity six feet per second, flow forty-two foot seconds, price \$2.30 per foot, or \$12,144 per mile. For four miles, \$48,576.

*Estimated Horse-power.*

Elevation at proposed wheel plant is 4,552, elevation at point of intake, which is situated at the forks is 4,965, making a difference in elevation of 413 feet; deducting grade of four miles of pipe (64 ft.) there remains an effective head of 349 feet which gives 1,364 horse-power.

*Estimated Cost of Plant.*

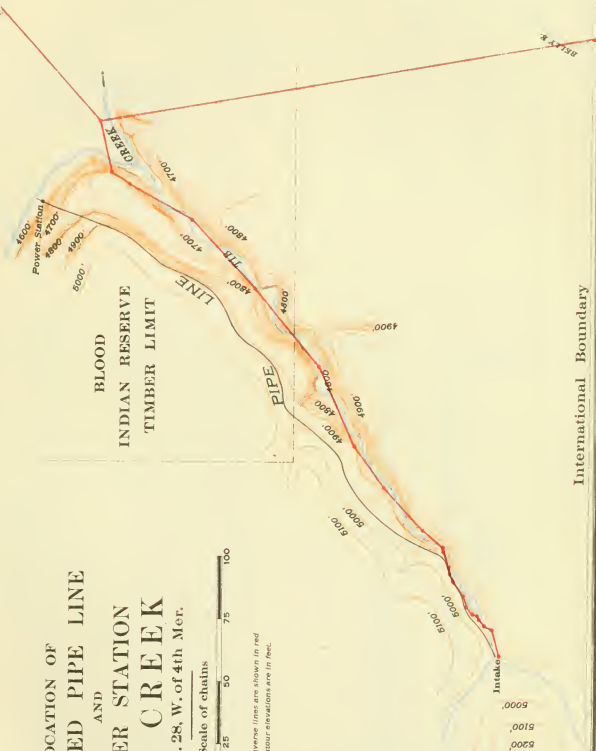
Intake—	
Masonry, 90 cubic yards at \$6. . . . .	\$540 00
Timber, 10,000 feet B.M. at \$35. . . . .	350 00
Total. . . . .	\$ 890 00
Pipes. . . . .	48,576 00
Excavation for pipes, 7,000 cubic yards at 50c. . . . .	3,500 00
Wheel plant. . . . .	68,200 00
Electrical equipment. . . . .	40,920 00
Total cost. . . . .	\$162,086 00
Cost per horse-power in bringing water to turbine . . . . \$	38 33
Cost per horse-power wheel plant . . . . .	50 00
Cost per horse-power electrical equipment. . . . .	30 00
Total cost per horse-power. . . . .	\$ 118 33
Placing depreciation on the whole plant. . . . .	2%
Repairs. . . . .	1%
Interest. . . . .	6%
Taxes and insurance. . . . .	1%
Total. . . . .	10%

# LOCATION OF PROPOSED PIPE LINE AND POWER STATION TIB CREEK Tp. 1, R. 28, W. of 4th Mer.

Scale of chains

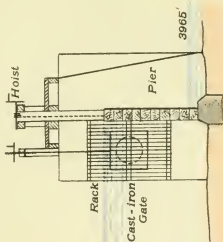
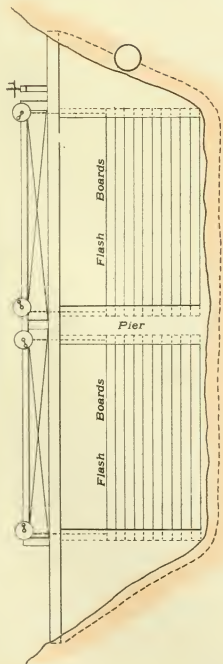


NOTE.—Traverse lines are shown in red  
Contour elevations are in feet.





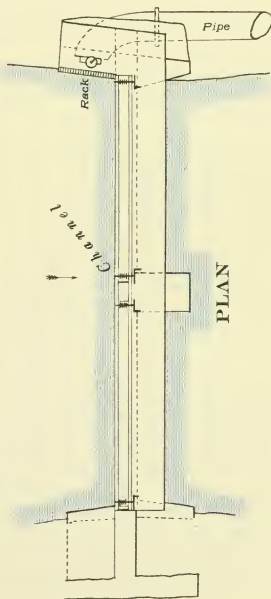
# ELEVATION



# SECTION

## INTAKE TIB CREEK

Scale of feet.  
0 5 10 15 20



# PLAN



## SESSIONAL PAPER No. 25b

Fixed expenses per horse-power per annum, \$188.83 at 10%	\$11 88
Running expenses.....	2 00

Total cost per horse-power per annum (for 24 hr. day).. \$13 88

The power generated by this plant could be transmitted to Cardston, a distance of seventeen miles, or to Macleod, forty-five miles, where it could be used for manufacturing purposes.

*Gauging made October 2, 1908.*

*Gurley meter No. 617.*

*Discharge 51 foot seconds.*

SOUNDING.		Depth of Observation.	Revolution.	Second.	Velocity.	—
Distance from zero point.	Depth.					
5	1'10	1%	20	40	1'17	
10	1'80	.....	20	21	2'20	
15	2'10	.....	20	22	2'10	
20	1'60	.....	10	30.5	1'00	
25	0'00	.....				Blood Timber Reserve.

NOTE.—On October 4 discharge 49.8 foot seconds. October 5 discharge 50.8 foot seconds.

## WATERTON LAKE.

Estimate of cost of a hydro-electric plant for 1,127 horse-power proposed to be erected at the head of the narrows of the upper Waterton lake in the northeast quarter of section 23 and northwest quarter of section 24, township 1, range 30, west of the fourth meridian.

*Topographical Description.*

The upper part of the lake above the narrows covers an area of 4.3 square miles, 2.4 square miles on the Canadian side, 1.9 square miles on the American side, and runs in a southerly direction, while the lower part runs in an easterly direction; the mountains are free from timber, but some may be found on the gulches and on the flats; at the head of the lake there is about two square miles of marketable timber. The lake is very picturesque and attracts many visitors every summer.

The narrows are 375 feet wide and the banks and bottom are of hard crystallized limestone. On both sides of the lake above, and on the east side below the narrows, the mountains rise directly from the edge of the lake, while on the west side below the narrows there is a valley varying in width from half a mile to one and one-half miles, free from timber except for a narrow strip of cottonwood on the flats. The valley below the narrows is well adapted for grazing, but on account of its high altitude is of little value for raising grain.

*Survey.*

The survey was connected with the southeast corner of section 35, township 1, range 30. It was found in plotting that some mistake had been made in reading



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the distance or angle of some course, or in entering the reading in the note-book which was done by my assistant. The section lines are shown only approximately, but the mill sites are well within the area reserved for that purpose.

The levels were connected with the Canadian irrigation survey, Waterton lake, elevation 4,186 feet.

The lands to be reserved for mill site are the southeast quarter of section 26, the northeast quarter of section 23 and the west half of the southeast quarter of section 23, township 1, range 30.

*Drainage Basin.*

The drainage basin of the upper Waterton lake is about 230 square miles, of which about 110 square miles is south of the international boundary, and is bounded on the west by the continental divide.

*Maximum and Minimum Flow.*

From the available records at my disposal I would estimate the minimum flow at 200 foot seconds occurring between April 1 and 15 and September 5 and 20. The high water mark at flood level is about ten feet above the ordinary level.

*Gauging.*

September 10, 1906.. . . .	442	foot seconds	} Canadian Irrigation Surveys. W. Thibaudeau.
September 20, 1907.. . . .	2,176	" "	
September 5, 1908... . . .	205	" "	
September 18, 1908.. . . .	238	" "	
October 16, 1908... . . . .	503	" "	

*Location of Dam.*

The proposed dam is situated twenty-eight miles from Cardston and thirty-five miles from Pincher, the two nearest railway stations; the roads to both places are fair. There is also a saw-mill in the vicinity. Freight rate from Cardston to the mill site would be about nine dollars and about twelve dollars from Pincher.

*Estimated Cost of Masonry Dam.*

Height of dam.. . . .	50 feet.
Length of dam bottom.. . . .	375 "
Length of dam top.. . . .	680 "

Supposing that the ground would have to be excavated to a depth of ten feet at the side and bottom, the contents would be 26,500 cubic yards, estimating this at a cost price of six dollars per cubic yard the cost would be \$159,000.

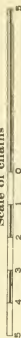
*Estimated Cost of Plant.*

Cost of dam.. . . .	\$159,000
Cost of wheel plant.. . . .	61,985
Cost of electrical equipment.. . . .	28,175
<hr/>	
Total cost of plant.. . . .	249,160
<hr/>	
Cost per horse-power in bringing water to turbine.. . . .	\$141 09
"                    "            of wheel plant.... . . . .	55 00
"                    "            electrical equipment.. . . .	25 00
<hr/>	
Total cost per horse-power per annum.. . . .	221 09

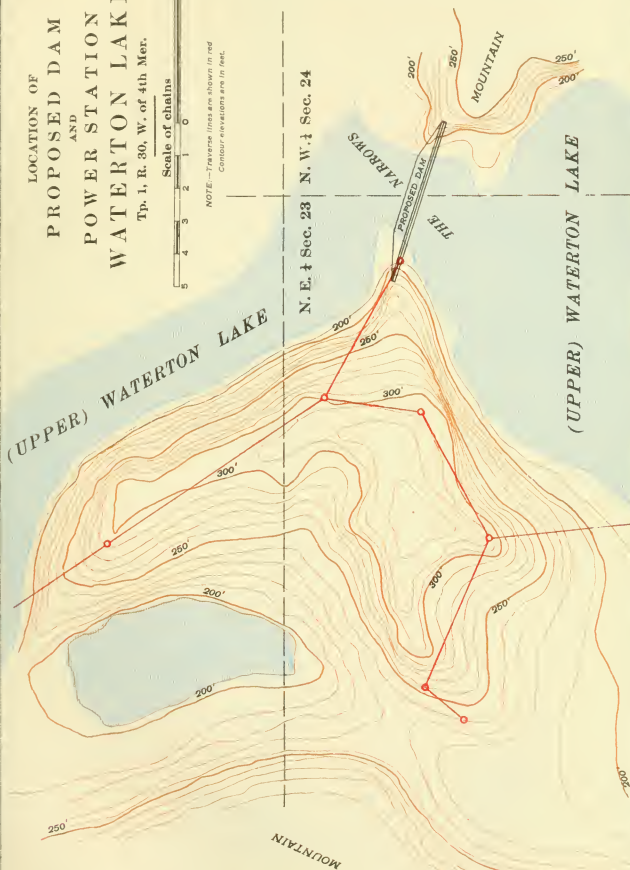
# LOCATION OF PROPOSED DAM AND POWER STATION WATERTON LAKE

Tp. 1, R. 30, W. of 4th Mer.

Scale of chains

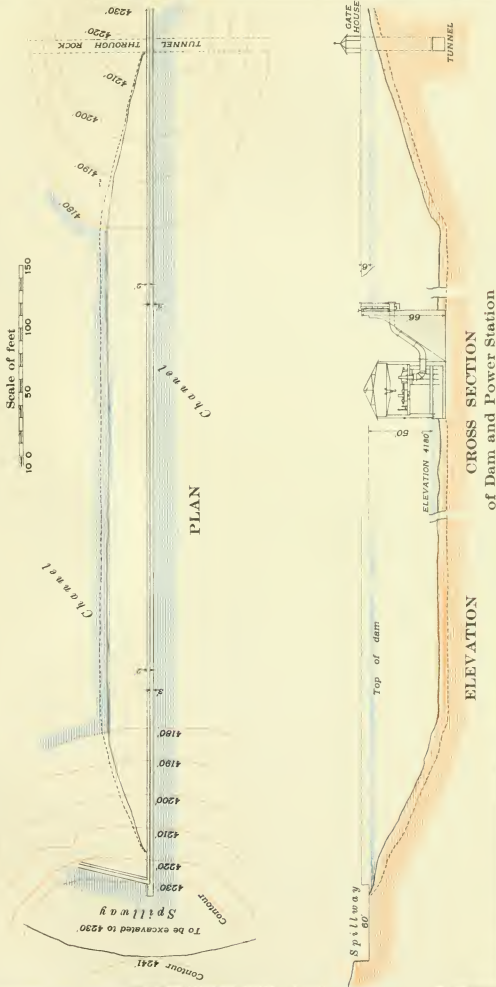


NOTE.—Traverse lines are shown in red  
Contour elevations are in feet.





PRACTICAL DIAGRAM  
OF  
PROPOSED DAM AND POWER STATION  
AT THE NARROWS  
WATERTON LAKE





## SESSIONAL PAPER No. 25b

Placing depreciation on whole plant at. . . . .	2	per cent.
Repairs. . . . .	1	"
Interest. . . . .	6	"
Taxes and insurance. . . . .	1	"
Total. . . . .	10	"

*Cost of Operation.*

Fixed expenses per horse-power, \$221.00 at 10% . . . . .	\$22 10
Running expenses. . . . .	2 00

Total cost per horse-power per annum (24 hr. day) . . . . . \$24 10

The power could be transmitted to Cardston, Pincher and other towns, but there are other more economical water-power propositions available for those places. Considering the dam from an irrigation point of view, it will be found that the run off at flood level in spring and fall could be collected in the reservoir thus formed, avoiding floods, and adding 340 foot seconds or 126,000 acre feet per irrigation season of six months, thus more than doubling the capacity of the river for irrigation purposes.

## WATERTON RIVER.

*Gauging made October 16, 1908.*

*Gurley meter No. 617.*

*Discharge 503 foot seconds. Total area, 257 sq. ft.*

SOUNDING.		Depth of Observation.	Revolution.	Second.	Velocity feet per second.	Discharge per section.	
Distance from zero point.	Depth.						
10	1.2	1%	50	47.0	2.47	28.16	
15	1.7	.....	50	35.2	3.29	27.60	
20	1.7	.....	50	35.8	3.32	28.01	
25	1.6	.....	50	36.0	3.21	25.70	
30	1.6	.....	50	41.8	2.75	22.00	
35	1.6	.....	50	48.0	2.42	19.36	
40	1.6	.....	50	55.3	2.10	16.80	
45	1.3	.....	30	53.4	1.33	16.80	
50	1.0	.....	.....	.....	.....	.....	
60	0.6	.....	20	24.0	0.41	2.17	
65	0.0	.....	0	0.0	.....	.....	Island.
70	0.6	.....	.....	.....	0.88	8.81	
75	1.0	.....	30	54.2	1.30	18.98	
80	1.5	.....	30	54.2	1.43	24.88	
85	1.8	.....	30	48.8	1.53	26.93	
90	1.8	.....	30	45.6	1.74	33.76	
95	2.0	.....	30	37.9	1.92	37.63	
100	2.0	.....	30	36.2	2.01	40.20	
105	2.0	.....	30	34.6	2.01	36.60	
110	1.9	.....	30	34.5	1.98	33.66	
115	1.6	.....	30	35.2	2.10	42.00	
120	1.9	.....	30	33.0	2.10	13.80	
125	0.9	.....	30	0.0	0.00	0.00	

Waterton river.  
Gauged above confluence of Blakiston  
brook and Boulder creek.

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## OIL CREEK.

Estimate of cost of hydro-electric plant for 392 horse-power proposed to be erected on Oil creek in the northwest quarter of section 23, township 1, range 30, west of the fourth meridian, the intake being half a mile up the creek.

*Topographical Description.*

Oil creek, a tributary of Waterton lake, receives its water supply from the snow melting on the surrounding peaks. The flow varies much on this account and a hot and rainy summer might greatly diminish the water supply before fall.

At the foothills there is a fall of about thirty feet, from this point up, the creek runs through a gulch or canyon cut through solid rock, the right limit following the foothill closely; on the left there is a valley between 200 and 300 feet in width, covered with gravel and loam and containing some timber, principally spruce, between ten and fourteen inches in diameter, to the place of intake. The country in the vicinity is of no value for farming and of very little value for grazing.

From the falls up the creek there are a series of cascades. The strike is east and west; dip southerly at 20°.

*Survey.*

The survey of the water-power was connected with the southeast corner of section 35, township 1, range 30.

It was found in plotting that some mistake had been made in reading the distance or angle of some course or in entering the reading in the note-book which was done by my assistant. The section lines are shown only approximately, but the mill site is well within the area reserved for that purpose.

The levels were connected with the Canadian irrigation survey, Waterton lake. elevation 4,186 feet.

The land to be reserved for mill site is the southwest quarter of section 23, township 1, range 30.

*Drainage Basin.*

The drainage basin of Oil creek is about twelve square miles.

*Maximum and Minimum Flow.*

The maximum and minimum flow is very uncertain as there are few data.

August 18, 1908, I explored Oil creek and estimated the volume of water to be from fifty to sixty foot seconds.

*Gauging.*

September 4, 1908.. . . . .	1,437 foot seconds.*
October 16, 1908.. . . . .	96 " " †

At the foot of the falls the elevation is 4,186 feet and at the point of intake 4,443 feet making a difference in elevation of 257 feet.

The water from the intake to the falls would have to be carried in a stave pipe twenty-seven inches in diameter, half a mile long, grade ten feet per mile, velocity four feet per second, flow sixteen foot seconds. Deducting grade of pipe (seven feet) there remains an effective head at the falls of two hundred and fifty feet which would generate 392 horse-power, figuring the minimum flow at fourteen foot seconds.

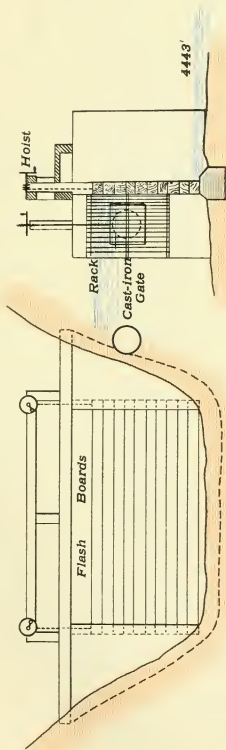
*Location of Mill Site.*

The proposed mill site is located at the foot of the falls about twenty-eight miles from Cardston and thirty-four miles from Pincher, the two nearest railway stations; the roads are fair.

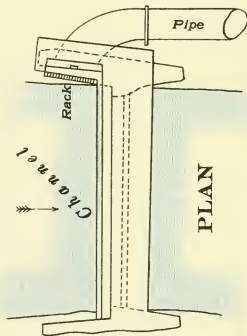
\* Canadian Irrigation Surveys.—†Thibaudeau.



## ELEVATION



## SECTION



## INTAKE OIL CREEK

Scale of feet.

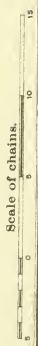




LOCATION OF  
PROPOSED PIPE LINE  
AND  
POWER STATION  
OIL CREEK  
Tp. 1, R. 20, W. of 4th Mer.



NOTE.—Traverse lines are shown in red  
Contour elevations are in feet.





## SESSIONAL PAPER No. 25b

Freight rate from Cardston about. . . . . \$ 9 00 per ton.  
 " " Pincher. . . . . 12 00 "

*Estimated Cost of Plant.*

## Intake—

Masonry, 60 cubic yards at \$6. . . . . \$360 00  
 Timber, 4,500 feet B.M., at \$38. . . . . 171 00

Total. . . . . \$531 00

Pipe 27 inch diameter at \$1.90 per lineal foot or \$10,032  
 per mile for one half mile. . . . . \$ 5,016

1,800 cubic yards excavation for pipe at 50 cents. . . . . 900

Wheel plant. . . . . 19,600

Electrical equipment. . . . . 11,760

Total cost. . . . . \$37,807

Cost per horse-power bringing water to turbine. . . . . \$16 44

" " of wheel plant. . . . . 50 00

" " electrical equipment. . . . . 30 00

Total cost per horse-power. . . . . \$96 44

Placing depreciation on whole plant at. . . . . 2 per cent.

Repairs. . . . . 1 "

Interest. . . . . 6 "

Taxes and insurance. . . . . 1 "

Total. . . . . 10 "

Fixed expenses per horse-power, \$96.44 at 10 p.c. . . . . \$ 9 64

Running " " . . . . . 2 00

Total cost per horse-power per annum (24 hr. day). . . . . 11 64

A part of this cheap power might be developed and utilized in the construction of a reservoir for irrigation purposes on the Waterton lake or river. In addition to this it could be used for prospecting the oil fields for which the geological conditions are favourable.

*Gauging made October 16, 1908.*

*Gurley meter No. 617.*

*Discharge 96 cubic feet per second. Total area, 8,809 feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per minute.	Discharge per section.	
Distance from zero point.	Depth.						
0	.....	6/10	.....	.....	.....	.....	
6	1'3	.....	50	47'0	2'47	18'40	
11	1'4	.....	50	34'6	3'44	22'00	
16	1'3	.....	50	42'0	2'75	17'87	
21	1'4	.....	50	44'0	2'63	17'75	
26	1'3	.....	40	47'5	2'02	15'76	
31	0'7	.....	.....	0	.....	.....	
36	0'5	.....	40	56'0	1'48	4'59	
41	0'0	.....	0	0'0	.....	.....	Oil creek, gauged about 150 yards below the fall.

BLAKISTON BROOK.

Estimate of cost of a hydro-electric plant for 712 horse-power proposed to be erected in the northeast quarter of section 6, township 2, range 29, west of the fourth meridian.

*Topographical Description.*

Blakiston brook, a tributary of Waterton lake, receives its water supply from the snow melting on the surrounding peaks. The valley is narrow averaging about a quarter of a mile in width and running in a westerly direction; the right limit of the brook follows the foothill closely, while the left side consists of benches.

From the foothill to the place of intake there are no streams or gulches through the valley which would cause trouble in the construction of a canal. For half a mile from the intake the brook runs through solid rock formation, the remainder of its course to Waterton lake is partly through gravel and partly through rock. On the north side of the brook the valley and foothills are open and covered with loam and gravel; in a few places towards the intake there are slate rock outcroppings and there is good grazing all through the valley.

On the south side the foothills are timbered with small spruce and pine averaging six inches in diameter.

The brook at flood level is a torrent but carries no driftwood.

The valley on the north side to lower Waterton lake is regular in slope; the soil is loam, and is well adapted for canal purposes.

SURVEY.

The survey of the water-power was connected with the northeast corner of section 5, township 2, range 29, the corner post being 19.45 chains north of station 3.

The levels were connected with the Canadian irrigation survey, lower Waterton lake, elevation 4,150 feet.

The land to be reserved for mill site is the east half of section 6, township 2, range 29.

*Drainage Basin.*

The drainage basin of Blakiston brook is about fifty-eight square miles and extends to the head of the south Kootenay pass on the continental divide.

*Minimum Flow.*

On August 20, 1908, I explored the brook and estimated the flow at fifty foot seconds.

October 16, 1908, I gauged the brook and found the discharge to be eighty-five foot seconds.

From its drainage basin compared with Waterton river and local conditions I believe it safe to estimate the minimum flow at forty foot seconds. To date there is no available data from which the minimum flow may be determined.

*Location of Power Plant.*

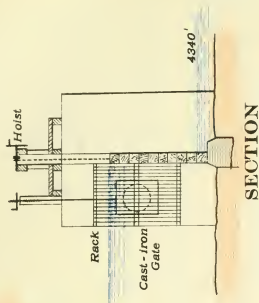
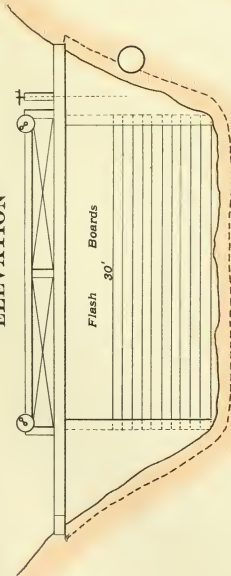
The proposed power plant is located on the west shore of the lower Waterton lake twenty-three miles from Cardston and thirty-two miles from Pincher, the two nearest railway stations. The roads are fair.

Freight rate from Cardston about.....	\$ 8 00 per ton.
“ “ Pincher “ .....	11 00 “

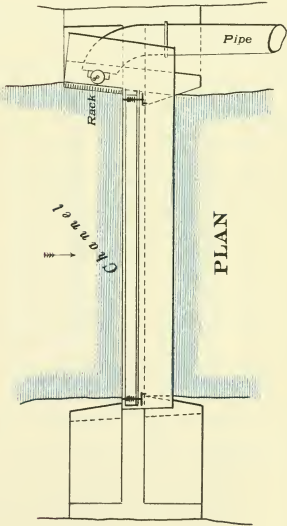
Good building material can be obtained in the vicinity; there is also a saw-mill close by.

I propose to bring the water through pipes and canal to the wheel plant.

# ELEVATION



# SECTION



# PLAN

# INTAKE

# BLAKISTON BROOK







# LOCATION OF PROPOSED CANAL, PIPE LINE AND POWER STATION BLAKISTON BROOK Tp. 2, R. 29 and 30, W. of 4th Mer.

NOTE.—Transverse lines are shown in red.  
Contour elevations are in feet.





## SESSIONAL PAPER No. 25b

*Estimated Cost of Canal and Pipe.*

It would require four miles of canal, bottom two feet, slopes 1-1, depth of water 3.5 feet, height of bank five feet, grade per mile four feet, velocity 2.1 feet per second, volume of water forty-one foot seconds. This canal would require the excavation of 3,300 cubic yards per mile at 50 cents per cubic yard, \$1,650 per mile. Total cost for four miles, \$6,600.

*Pipe.*

It would require one mile of stave pipe 36 inches in diameter; grade 16 feet per mile, velocity 6 feet per second, flow 42 second feet, price \$2.30 per foot, \$12,144 per mile.

*Estimated Horse-power.*

The elevation at the intake is 4,340 feet and at the power house it is 4,150 feet, making a difference in elevation of 190 feet; deducting grade of canal and pipes, thirty-two feet, there remains an effective head of one hundred and fifty-eight feet, giving 712 horse-power.

*Estimated Cost of Plant.*

## Intake—

Masonry, 80 cubic yards at \$6. . . . .	\$ 480 00
Timber, 7,500 feet B.M., at \$36. . . . .	270 00

Total. . . . .	\$ 750 00
----------------	-----------

Canal. . . . .	6,600 00
Pipes. . . . .	12,144 00
Excavation for pipes, 1,800 cubic yards at 50c. . . . .	900 00
Wheel plant. . . . .	35,600 00
Electrical equipment. . . . .	21,360 00

Total cost. . . . .	\$77,354 00
---------------------	-------------

Cost per horse power in bringing water to turbine. . . . .	28 65
“ “ “ “ of wheel plant. . . . .	50 00
“ “ “ “ electrical equipment. . . . .	30 00

\$ 108 65
-----------

Placing depreciation on whole plant at 2%	
Repairs. . . . .	1%
Interest. . . . .	6%
Taxes and insurance. . . . .	1%

Total. . . . .	10%
----------------	-----

Fixed expenses per horse-power, \$108.65 at 10%. . . . .	10 86
Running “ “ “ . . . . .	2 00

Total cost per horse-power per annum (24 hr. day). . . \$	12 86
---	-------

It is possible that a small canal would give some trouble in the winter time; in that case it could be replaced by pipe which would reduce the horse-power to 495.

*Cost of Plant, all Pipe.*

Intake. . . . .	\$ 750 00
Pipe 5 miles at \$12,144 per mile. . . . .	60,720 00
Excavation for pipes 9,000 cubic yards, 50c. . . . .	4,500 00
Wheel plant. . . . .	24,750 00
Electrical equipment. . . . .	14,850 00

Total cost. . . . . \$105,570 00

Cost per horse-power in bringing water to turbine. . . . .	\$ 133 27
“ “ “ of wheel plant. . . . .	50 00
“ “ “ electrical equipment. . . . .	30 00

Total cost per horse-power. . . . . \$ 213 27

Placing depreciation on whole plant at 2%	
Repairs. . . . .	1%
Interest. . . . .	6%
Taxes and insurance. . . . .	1%

Total. . . . . 10%

Fixed expenses per horse-power, \$213.27 at 10% . . . .	\$ 21 33
Running “ “ “ . . . . .	2 00

Total cost per horse-power per annum (24 hr. day) . . . \$ 23 33

*Gauging made October 16, 1908.*

*Gurley Meter No. 617.*

*Discharge 85.10 second feet. Total area 58 square feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per minute.	Discharge per section.	
Distance from zero point.	Depth.						
0	0	6/10	0				
5	1.5	6/10	30	72	0.99	7.87	
10	2.1	6/10	30	53	1.33	13.70	
15	2.3	6/10	30	40	1.74	19.58	
20	2.1	6/10	30	37	1.88	19.93	
25	2.0	6/10	30	41.4	1.68	16.80	
30	1.6	6/10	20	52	1.14	7.22	
35	0.0	6/10					

Blakiston brook, gauged about half a mile up from its mouth.

SESSIONAL PAPER No. 25b

## BOULDER CREEK.

*Gauging made October 16, 1908.**Gurley Meter No. 617.**Discharge 29.01 second feet. Total area 14 square feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per minute.	Discharge per section.	
Distance from zero point.	Depth.						
0	0	6/10	.....	..	.....	.....	
1.3	0.3	.....	.....	..	.....	.....	
3.3	0.6	.....	30	55.5	1.95	4.39	
5.3	0.8	.....	.....	..	.....	.....	
7.6	1.4	.....	50	38.5	3.00	15.30	
10.6	1.2	.....	30	37.5	1.95	4.39	
13.12	0.8	.....	30	63.2	1.12	2.18	
15.8	0.8	.....	20	42.5	1.10	2.75	
20.5	..	.....	.....	.....	.....	.....	Boulder creek, gauged one mile above its mouth.

## SOUTHFORK RIVER.

Estimate of cost of hydro-electric plant for 2,700 H. P. proposed to be erected in the northwest quarter of section 24, township 6, range 2, west of the fifth meridian.

*Topographical Description.*

The canyon of Southfork river is two hundred feet in depth, and cuts through an open plateau whose altitude is 3,970 feet; the bottom and banks are of solid sandstone which is visible nearly everywhere. It begins about the centre of the southeast quarter of section 9 and extends to Canyon creek from which the valley of the Southfork runs in a southeasterly direction for five or six miles, and consists of rolling slopes partly timbered and partly open prairie; the valley is broken in places by hills and averages half a mile in width and is partly under cultivation. The best location for a dam is in the northwest quarter of section 24, township 6, range 2. Through the canyon the strike is about north and south and dips easterly at about 30°.

*Survey.*

The survey of the water-power was connected with the northeast corner of section 13, township 6, range 2.

The levels were connected with the Canadian irrigation survey bench mark 98, elevation 4.031; on the plan 177 feet should be added to all elevations given.

The lands to be reserved for mill site are the north half of the northeast quarter of section 13 and the south half of the southeast quarter of section 24, township 6 range 1.

*Drainage Basin.*

The drainage basin of Southfork river at the proposed mill site is 285 square miles, extending to the continental divide in a southwesterly direction.

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*Minimum and Maximum Flow.*

From the data at my disposal I would estimate the minimum flow to be about 200 foot seconds and to occur between April 1 and 15 and September 5 and 20. The high water mark at flood level last year was eleven feet above the ordinary level.

*Gauging.*

July 10, 1908.....	Discharge 1,327 foot seconds	} Canadian irrigation surveys—Thibaudeau.
July 18, 1908.....	“ 859 “	
August 21, 1908.....	“ 235 “	
October, 26, 1908.....	“ 256 “	

*Location of Dam.*

The proposed dam is about nine miles from Cowley; the freight rate would be three dollars per ton. The elevation of highway bridge floor which is situated about half a mile above the proposed dam, is 3,765 feet.

*Estimate of Cost of Masonry Dam.*

	Feet.
Height of dam .. . . . . .	120
Length of dam bottom .. . . . . .	66
Length of dam top .. . . . . .	160

Supposing the ground would have to be excavated to a depth of ten feet at the side and bottom, the cubic contents would be 29,000 cubic yards; estimating this at \$6.00 per cubic yard—\$174,000.

*Estimated Cost of Plant.*

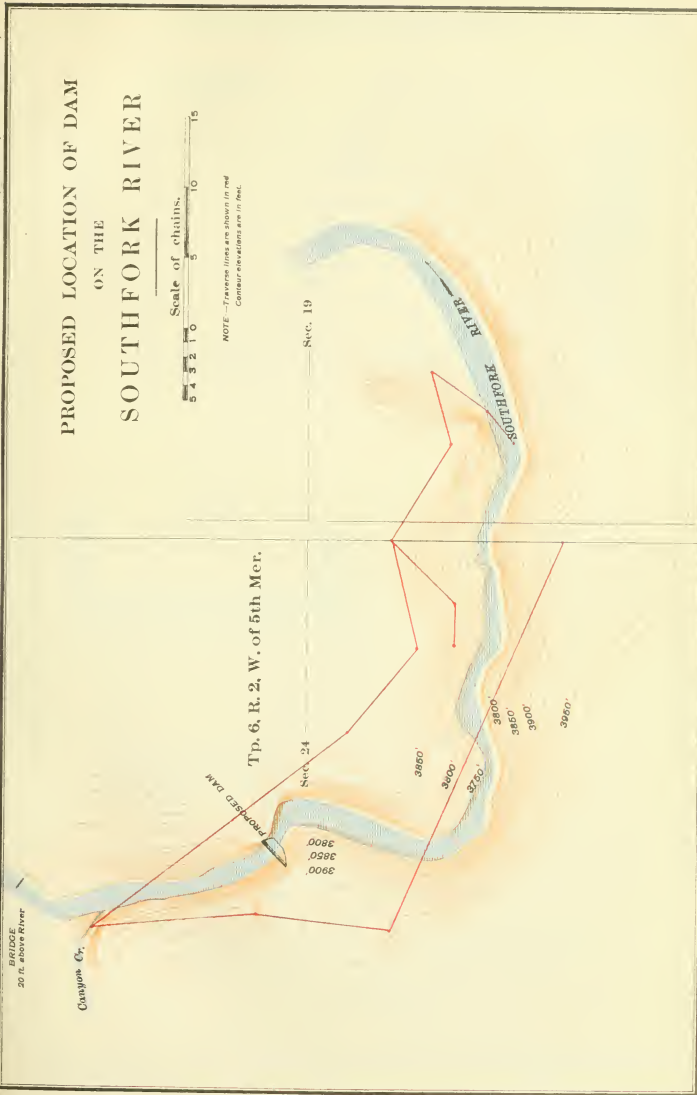
Masonry dam.....	\$174,000 00
Wheel plant .. . . . . .	148,500 00
Electrical equipment.....	75,600 00
Total cost .. . . . . .	398,100 00
Cost per horse-power in bringing water to turbine.. . . .	\$64 44
Cost per horse-power of wheel plant .. . . . . .	55 00
Cost per horse-power electrical equipment.. . . . . .	28 00
Total cost per horse-power .. . . . . .	147 44

*Cost of Operation.*

	Per Cent.
Placing depreciation on whole plant at .. . . . . .	2
Repairs .. . . . . .	1
Interest .. . . . . .	6
Taxes and insurance .. . . . . .	1
	10

*Cost of Operation.*

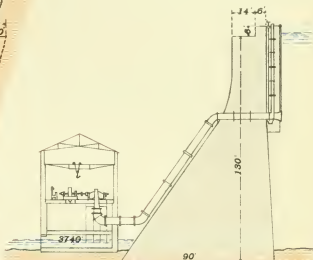
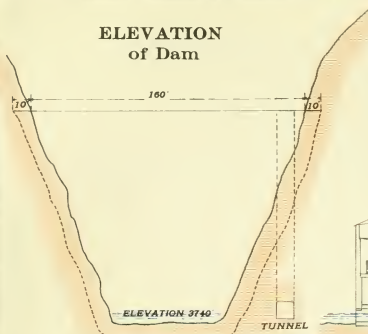
Fixed expenses per H. P. \$147.44 at 10 per cent.. . . . .	\$14 74
Running expenses per H. P. . . . . . .	2 00
Total cost per H.P. per annum (24 hr. day).....	16 74





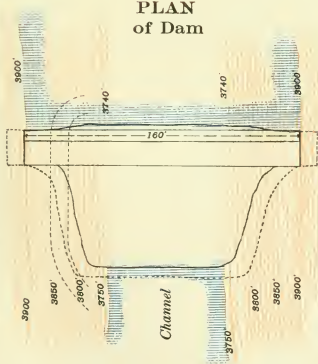


**ELEVATION  
of Dam**



**CROSS SECTION  
of Dam and Power Station**

**PLAN  
of Dam**



**PRACTICAL DIAGRAM  
OF  
PROPOSED DAM AND POWER STATION  
SOUTH FORD RIVER**

Scale of feet





## SESSIONAL PAPER No. 25b

The mill is situated in the middle of a large coal basin, and Cowley, Lundbreck, Pincher Creek and Pincher, with their elevators, flour mills, &c., would be within easy reach of the power plant. At present steam is the only source of power for these places.

*Gauging made October 24, 1908.*

*Gurley Meter No. 617.*

*Discharge 256 foot seconds. Total area 119 square feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per minute.	Discharge per section.	
Distance from zero point.	Depth.						
0	0	6/10	0	0	0	0	Southfork river gauged above confluence of Canyon creek.
10	0	.....	30	47.5	1.46	6.42	
15	.40	.....	30	45.0	1.55	10.85	
20	1.00	.....	50	57.0	2.02	24.64	
30	1.20	.....	50	48.5	2.40	35.04	
40	1.50	.....	50	51.0	2.27	36.32	
50	1.60	.....	50	42.0	2.75	44.55	
60	1.50	.....	50	45.0	2.57	50.37	
70	2.00	.....	50	60.6	1.92	32.64	
80	1.80	.....	30	53.0	1.33	15.42	
90	1.10	.....	0	0.00	.....	.....	
100	0.00	.....					

## MILL CREEK.

*Gauging made October 24, 1908.*

*Gurley Meter No. 617.*

*Discharge 37.82 foot seconds. Total area 38 square feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per second.	Discharge per section.	
Distance from zero point.	Depth.						
0	0	6/10	0	0	.....	.....	Mill creek gauged 300 yds. above its mouth.
5	1.3	.....	20	83.0	0.59	3.85	
10	1.8	.....	20	68.2	0.71	6.30	
15	2.1	.....	30	49.5	1.44	14.40	
20	1.8	.....	30	53.0	1.31	11.10	
25	1.0	.....	10	45.0	0.55	2.23	
31	0.0	.....	0	0	.....	37.88	

## CROWSNEST RIVER.

Estimate of cost of a hydro-electric plant for 630 H. P. proposed to be erected at the foot of the falls of Crowsnest river in the southeast quarter of section 28, township 7, range 2, west of the fifth meridian.

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*Topographical Description.*

The Crowsnest river valley is well defined, consisting of rolling slopes interspersed in places with mountains; it is free from cut banks and is partly timbered and partly open prairie; it is most picturesque in appearance, averaging about three-quarters of a mile in width; the water is clear and cold. The banks of the river seldom exceed ten or twelve feet in height.

There is a fault in the hard sandstone formation which produces the falls, the country rock below and above the falls lies practically horizontal. The Canadian Pacific railway follows the river at an elevation of about fifteen feet above high water mark.

The rock formation in general is of sandstone and limestone.

The river carries no driftwood.

The site of the falls is as cheap as could be found for generating power. Coal mining and mixed farming are the principal occupations of the settlers.

The survey of the mill site was connected with the northeast corner of section 21, township 7, range 2.

The levels were connected with the Canadian Pacific railway bridge, elevation 3,784 feet.

The lands to be reserved for mill site are the west quarter of the southeast quarter of section 27, and the east half of the southeast quarter of section 26, township 7, range 2.

*Drainage Basin.*

The drainage basin of Crowsnest river is two hundred and sixteen square miles from the mill site, and extends to the head of Crowsnest Pass.

*Minimum Flow.*

From the available records at my disposal the minimum flow (140 foot seconds) appears to occur between April 1 and 15 and September 15 and October 1. There are no indications to show that the high water mark at flood level is very much above the ordinary level, the Canadian Pacific railway track being in some places within ten feet of ordinary level.

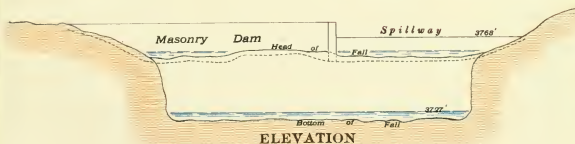
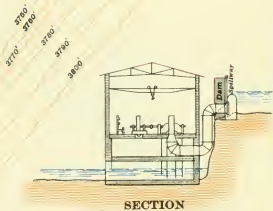
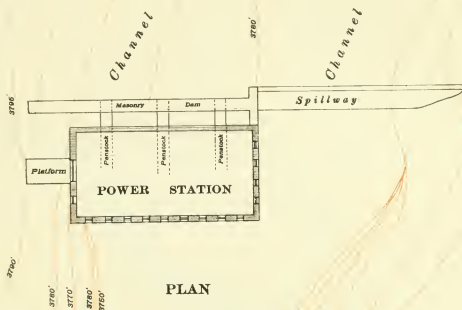
*Gauging.*

## FROM CANADIAN IRRIGATION SURVEY.

September 7, 1907..	..257	foot seconds	} From Canadian irrigation survey.
July 11, 1908..	.. 532	"	
August 14, 1908..	.. 177	"	
August 18, 1908..	.. 310	"	
September 10, 1908..	.. 150	"	
September 16, 1908..	.. 146	"	
October 26, 1908..	.. 148	"	Thibadeau.

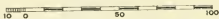
*Location of Dam.*

The proposed dam is situated about two and one-half miles from Cowley station and is close to the Canadian Pacific railway track; it will raise the water within sixteen feet of the railway bridge where track elevation is 3,793 feet, or three feet above the ordinary level. Building material, lumber and stone could be secured in the vicinity.



PRACTICAL DIAGRAM  
OF  
PROPOSED DAM AND POWER STATION  
AT THE  
FALLS, CROWNEST RIVER

Scale of feet



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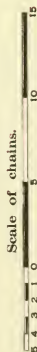
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# PROPOSED LOCATION OF DAM CROWSNEST RIVER FALLS

Tp. 7, R. 2, W. of 5th Mer.



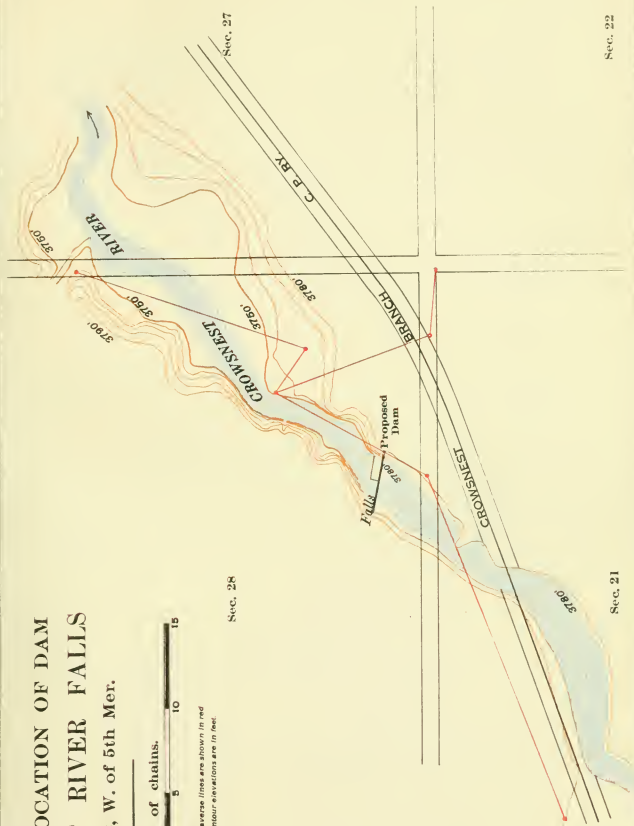
NOTE.—Traverse lines are shown in red  
Contour elevations are in feet.

Sec. 28

Sec. 27

Sec. 21

Sec. 22







*Estimated Cost of Dam.*

Height of dam . . . . .	9 feet
Length of dam bottom . . . . .	165 "
Length of dam top . . . . .	250 "
Cubic contents of dam, 800 cub. yds. at \$6. . . . .	\$4,800.00

*Estimated Horse-power.*

Dam 9 feet and natural fall 31 feet, making a total fall of 40 feet with a minimum flow of 140 foot seconds, gives 630 horse-power.

*Estimated Cost of Plant.*

Cost of dam . . . . .	\$ 4,800
Cost of wheel plant . . . . .	31,500
Cost of electrical equipment . . . . .	18,900
Total cost . . . . .	<u>\$55,200</u>

Cost per horse-power in bringing water to turbine . . . . .	\$ 7.62
" " of wheel plant . . . . .	50.00
" " electrical equipment . . . . .	30.00
Total cost per horse-power . . . . .	<u>87.62</u>

Placing depreciation on whole plant at . . . . .	2 per cent.
Repairs . . . . .	1 "
Interest . . . . .	.6 "
Taxes and insurance . . . . .	1 "
Total . . . . .	<u>10 "</u>

*Cost of Operation*

Fixed expenses per horse-power, \$87.62 at 10 per cent. . . . .	\$ 8.76
Running expenses . . . . .	2.00
Total cost per horse-power per annum (24 hr. day) . . . . .	<u>10.76</u>

This plant would be situated in the heart of a vast coal basin twelve miles from Frank and two and one-half miles from Lundbreck coal mines.

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*Gauging made October 26, 1908.**Gurley Meter No. 617.**Discharge 142.9 cubic feet per second. Total area 187 square feet.*

Sounding.		Depth of Observation.	Revolution.	Second.	Velocity feet per second.	Discharge per section.	
Distance from zero point.	Depth.						
0	0	6/10	0	0	0	.....	Crownsnest river gauged at ford below C.P.R. bridge.
10	2.14	"	20	78.5	0.619	12.75	
20	2.10	"	20	42.2	1.11	23.31	
30	1.95	"	20	40.0	1.17	23.40	
40	2.00	"	20	40.8	1.16	23.20	
50	1.85	"	20	38.1	1.23	22.63	
60	1.60	"	20	40.5	1.16	16.39	
70	1.10	"	20	50.0	0.95	0.85	
80	0.85	"	20	52.8	0.93	8.0	
90	0.50	"	20	59.0	0.81	3.4	
100	.00	"	0	0	0	133.93	

## GOLD CREEK.

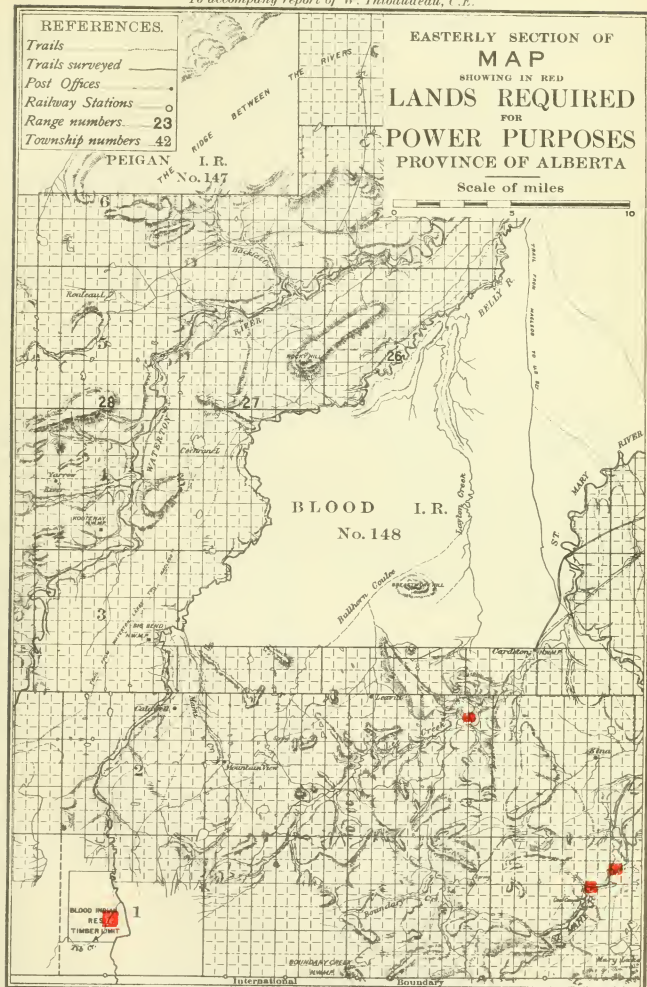
On August 29, 1908, I explored the creek and found the flow to be about forty-five foot seconds and as the barometer indicated a good fall per mile. I decided to return and make an instrumental survey of the creek.

On October 31, I commenced the survey; although it was the season of high water, the flow was found by gauging to be only thirty foot seconds. There are no snow peaks in the vicinity to aliment the flow; the drainage basin is very limited and conditions are favourable for a quick run off. The creek valley is about two hundred or three hundred yards in width.

Taking into consideration, local conditions and the fact that the town of Frank obtains its water supply from that creek, it was apparent that very little power could be developed and that not on a commercial basis, so I stopped the survey.

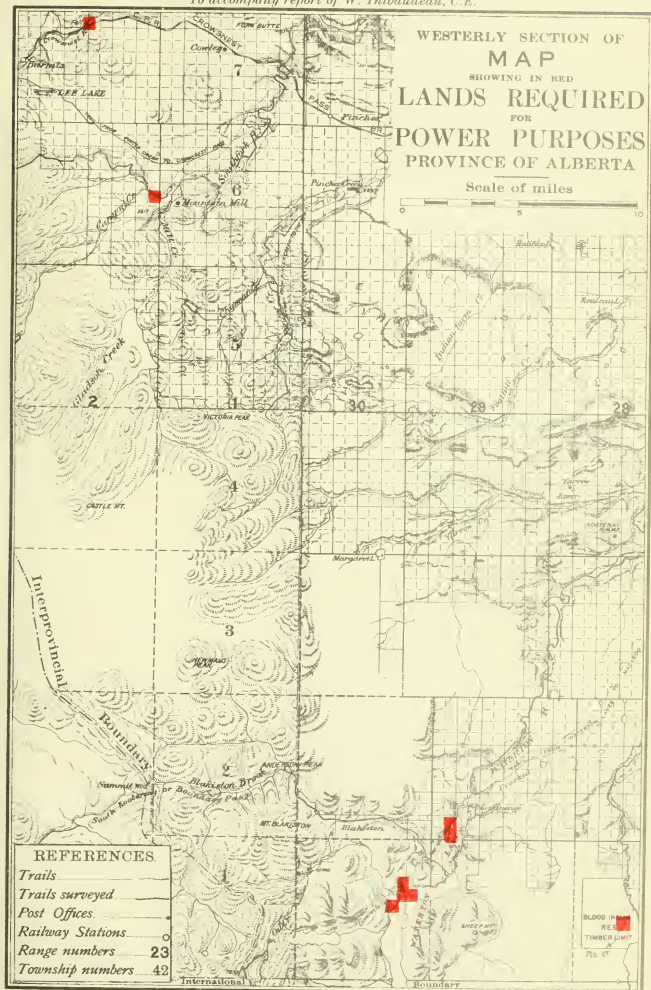
I have the honour to be, sir,  
Your obedient servant,

W. THIBAudeau,  
Civil Engineer.





Annual report of the Topographical Surveys Branch, 1908-1909.  
To accompany report of W. Thibaudeau, C.E.





## SESSIONAL PAPER No. 25b

## DEPARTMENT OF THE INTERIOR—CANADIAN IRRIGATION SURVEYS.

## DISCHARGE MEASUREMENTS AT REGULAR STATIONS.

On Crowsnest river at bridge on northeast quarter of section 26, township 7, range 2, west of the fifth meridian near Lundbreck post-office, province of Alberta.

Number.	Date.	Hydrographer.	Meter Number.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.	Remarks.
1	Sept. 7, '07..	T. J. W...	26	55	106	2.43	25	257.1	
2	July 11, '08..	H. C. R...	26	64	131.35	4.03	2.717	532.2	
3	Aug. 14, '08..	H. R. C...	26	53.5	78.9	2.25	1.80	172.3	
4	" 18, '08..	H. R. C...	26	59	103.9	2.99	2.23	310.82	
5	Sept. 10, '08..	H. C. R...	82	52	76.42	1.97	1.70	150.5	
6	" 16, '08..	H. C. R...	82	52	72.87	1.97	1.70	146.04	

On Oldman river, at cable station on northeast quarter of section 34, township 7, range 1, west of the fifth meridian near Cowley post-office, province of Alberta.

1	Sept. 6, '07..	.....	26	185	246.8	3.1	2.55	766.3	About 20% too high.
2	" 31, '08..	.....	26	181	310.83	3.99	2.50	1,242.96	
3	Aug. 13, '08..	.....	26	177.5	175.1	2.27	183.5	397.0	
4	" 19, '08..	.....	26	161.0	150.0	2.02	169.5	303.2	
5	Sept. 15, '08..	.....	82	115.0	104.68	1.62	150.0	170.18	

On Oldman river, at Naffia bridge near Macleod post-office, province of Alberta.

1	July 25, '06..	.....	26	250	447.5	5.75	2.3	1,229.6	
2	" 31, '06..	.....	26	230	398.1	2.60	2.1	1,013.9	
3	Oct. 2, '06..	.....	26	206	267.2	1.98	1.55	528.4	
4	June 25, '07..	.....	26	364.7	1,709.3	6.27	6.00	10,722.4	
5	Sept. 14, '07..	.....	26	295	583.8	2.63	2.55	1,569.2	
6	" 20, '07..	.....	26	307.0	924.7	3.24	3.47	2,994.3	

On Waterton river, at Waterton Mills near Waterton Mills post-office, province of Alberta.

1	Sept. 10, '06..	J. F. H..	26	289	219.66	2.01	.....	442.21	
2	" 20, '07..	I. J. W...	26	293	619.30	3.51	4.1	2,176.8	
3	" 5, '08..	H. C. R...	82	227	159.26	1.29	2.5	205.13	
4	" 18, '08..	H. R. C...	26	210.5	172.3	1.38	2.49	237.7	

On St. Mary River, at Cable station above A. R. & I., headgate near Kimball post-office, province of Alberta.

1	Sept. 22, '06..	.....	26	224	264.3	1.92	.....	508.1	
2	Aug. 3, '07..	.....	26	230	502.9	4.03	4.2	2,026.0	
3	June 29, '08..	.....	26	229	744.5	3.81	34.13	2,836.98	
4	Sept. 1, '08..	.....	82	219	324.2	1.60	2.50	519.22	
5	" 16, '08..	.....	26	219	339.0	1.71	2.50	519.80	



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## On Southfork river.

Number.	Date.	Hydro- grapher.	Meter Number.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.	Remarks.
1	July 10, '08..	.....	26	204.7	415.03	3.20	.....	1,327.83	B. M. 11.75 above water line. B. M. 1,225 but still water not added in area of discharge.
2	" 18, '08..	.....	26	137.3	225.7	3.81	.....	859.11	

## On Oldman river, north of Pincher.

1	July 15, '08..	H. C. R..	26	287	828.88	3.23	.....	2,671.99	
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## On Lee creek.

1	Sept. 2, '08..	.....	82	132	7.65	1.76	.....	13.47	
2	" 15, '08..	.....	26	215	14.42	0.79	.....	11.38	

## On Oil creek.

1	Sept. 4, '08..	.....	82	15.0	10.87	132	.....	14.37	
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## On A. R. &amp; I. flume, over South Willow creek.

1	Sept. 1, '08..	.....	82	27	51.3	3.69	1.90	189.45	
2	" 16, '08..	.....	26	27	79.65	5.16	2.95	440.91	

On Waterton river, province of Alberta at Royal North West Mounted Police detachment, north boundary section 20, township 5, range 27, west of the fourth meridian.

1	Sept. 26, '06..	.....	26	.....	.....	.....	2.9	300.2	
2	Aug. 15, '07..	.....	26	.....	.....	.....	.....	885.5	

## On Belly river.

1	June 19, '08..	.....	26	95	395.0	4.09	2.70	1,616.6	Station damaged and gauging was made two miles upstream at traffic bridge near Caldwell.
2	July 1, '08..	.....	26	92	290.4	3.24	2.40	939.75	
3	" 28, '08..	.....	26	101.5	280.97	3.27	.....	917.55	Gauging made from traffic bridge at Standoff.
4	Sept. 14, '08..	.....	26	85.5	138.0	1.50	.....	206.7	

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## APPENDIX No. 46.

## REPORT OF J. N. WALLACE, D.L.S.

SURVEY OF THE BOUNDARY BETWEEN BRITISH COLUMBIA AND YUKON TERRITORY, FROM  
TATSHENSHINI RIVER TO TAKHINI RIVER.

CALGARY, ALBERTA, December 4, 1908.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour to submit the following report on the survey of part of the boundary between British Columbia and the Yukon Territory during the season of 1908, undertaken in accordance with your instructions of April 28, 1908. The part of the boundary referred to in this report is that between Tatshenshini river, near the Dalton trail, and Takhini river, a distance of nearly thirty-six miles.

About the beginning of April, I was informed that everything pointed to an unusually early opening of the season in the Yukon, and I anticipated that work could be commenced this season earlier than last, on which occasion I had left Vancouver on June 7. Unfortunately, this anticipation did not prove to be well founded, for while it was certainly a very early season in the interior of the Yukon, where the snowfall the previous winter had been very light, yet I found conditions to be wholly different along the coast. Here the depth of snow was almost the heaviest on record, a large proportion having fallen late in March and during the early part of April.

I left Calgary on May 1, and reached Vancouver on May 5, having stopped over at Kamloops to purchase twenty pack horses. Having engaged the party and obtained the necessary outfit and supplies, I left Vancouver by the Canadian Pacific Railway company's steamer on May 14. Permission to land at Pyramid Harbour and to take the party up the Dalton trail through Alaska had been granted by the United States Government, and I wish to here acknowledge the uniform courtesy which we received from all United States officials, and indeed from every one with whom we came in contact while passing through Alaska.

The reasons for landing our outfit with horses at Pyramid Harbour were specified in detail in my report of last season. During the latter part of this season, however, a very good road has been constructed along the east side of Chilkat river from Haines to Wells, and the necessity of landing at Pyramid Harbour is now a thing of the past, as the best landing place is at Haines. At Wells a bridge is now under construction to connect this road with the new road, already finished, to Porcupine, and when the Klehini is bridged beyond Porcupine next summer, there will be no difficulty whatever in taking horses from Haines right up to Pleasant Camp, where Canadian territory is entered.

At Pyramid Harbour there were no regular facilities for landing, but through the courtesy of Mr. Walter Story, Superintendent of the Alaska Packers' Association, who had a steam launch and scow ready, we got everything on shore in an hour and a half after the arrival of the steamer, although we did not reach the harbour till near midnight.

From Pyramid Harbour the horses were taken up the old trail on the west side of Chilkat river and reached Wells, twenty-six miles farther up, after a two-days

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journey, while the rest of the party crossed over to Hindistuckie and from there went up in canoes on the river, reaching Wells on May 21.

On coming up in the steamer from Vancouver, the low altitude of the snow on the mountains as we neared Pyramid Harbour did not appear to augur well for our journey up to the boundary, and on reaching Wells, the last hope of conditions being favourable was dispelled by the news that the snow had not yet left Porcupine which was thirteen miles farther on our journey and only eight hundred feet above sea-level.

It became necessary therefore, to remain a short time at Wells where there was a little feed for the horses in order to avoid as much as possible having to purchase hay and oats at the Porcupine rates which were one hundred and twenty dollars a ton. In the meantime the horses made several trips to Porcupine taking the heavy outfit and supplies ahead of the camp.

We moved camp to Porcupine on May 26, the snow being then nearly all gone except in a few shaded parts of the road, but the grass at Porcupine was still backward and the horses had to be kept at Wells as much as possible.

Porcupine practically consists of the works of the Porcupine Gold Mining company which are very extensive. There is a United States postoffice in this place and a good general store. It is the last settlement on the way up to the boundary except the mining camp at Rainy Hollow, B.C., which however, is about four miles off the regular trail.

On June 5 we moved on to Pleasant Camp although the snow was still deep on the road near Pleasant Camp, but I wished to get the outfit across the Klehini river, as it was slowly rising and is always a troublesome river to cross as soon as the heat of summer has started the flow from the glaciers.

The first load was sent by pack horses to Rainy Hollow by the lower trail on June 17, the horses returning by the upper trail on June 19 but they were so exhausted by the deep snow, both going and returning, that we had to wait another few days before camp could be moved to Rainy Hollow. This was done on June 22. The upper trail was still too blocked with snow for horses to take a load and the lower trail, which was used, was then in an extraordinary condition. That part of it which was through heavy spruce timber, amounting to about two-thirds of the whole distance, had still three feet of snow, while the remainder, being in partly open country with willows, was covered with two feet of liquid mud.

At Rainy Hollow at this date about half of the total area was bare of snow and the grass was coming up rapidly just as soon as the snow left each part, as it always does in that country. It is, in fact, astonishing what a change will occur in a few days when a midsummer sun is acting on a great depth of snow.

Rainy Hollow is ten miles from Pleasant Camp and at an altitude of 2,500 feet, being 1,500 feet higher than Pleasant Camp.

We made the first trip with a load to Glacier Camp on June 29, crossing the summit which is at an altitude of 3,800 feet. Glacier is eighteen miles from Rainy Hollow. There was no snow south of Clear creek except in the narrow valleys of three streams where the snow had to be shovelled out. North of Clear creek there were only patches of shallow snow and at Glacier Camp, at an elevation of 3,050 feet, everything was green, I think the snow had probably left there about June 15, the great depth of snow this spring having been confined to the southerly slope of the coast mountains. On this slope there was the heaviest snowfall and the latest spring since the year 1891.

Camp was moved to Glacier on July 1 and to Bear Camp on July 4. From Bear Camp a pack trail was cut northerly and then northeasterly up the Blanchard valley to the place where I had ended work last season.

As regards the relative advantages of reaching the locality where the boundary intersects the Dalton trail by the route here mentioned or by way of Skagway and Whitehorse, it may be said that the route by the Dalton trail is much shorter, but is not available for so long a season as the Whitehorse route.

## SESSIONAL PAPER No. 25b

Travelling by Haines the total distance to the boundary from the sea is about ninety-five miles. Freight is easily taken to Wells, at the head of navigation, and can be thus left within sixty-seven miles of the boundary at a cost of about one dollar and forty cents per hundred pounds. From Wells an outfit would have probably to do most of its own freighting although assistance might be obtained as far as Pleasant Camp to which there is a good wagon road.

By the Whitehorse route it is nearly two hundred and fifty miles from Skagway to the boundary, being one hundred miles by railway and then sixty-five miles by wagon road to Champagne Landing. From there it is seventy-five miles to Dalton Post and then thirteen miles farther to the boundary. There is, of course, no trouble getting freight to Whitehorse, and assistance in transportation could probably be obtained from there as far as Champagne Landing, but the cost from the sea to the Landing is very great, amounting in all to about seven dollars a hundred pounds, and in addition there is the railway fare at twenty dollars for each man and each horse.

A great deal would therefore depend on whether a long or short season is necessary. If the advantages of a longer season outweigh the extra cost by Whitehorse, as they will often do, then this route is the better of the two, while for any undertaking which requires only a short season it would appear to be the better plan to wait until the Haines route is free from snow. For such an undertaking I think the best time to land at Haines would be at such a date that the summit of the Dalton trail between Rainy Hollow and Glacier Camp would be crossed about June 25. It is the condition of this summit which determines the length of season when travelling by this route.

The limiting date up to which the Dalton trail is available for horses at the end of the season varies considerably. In 1907 we crossed the Glacier summit on October 1. The trail had been bare of snow up to the previous day, but on that date snow was falling and on October 8, there was a depth of three feet. This season we crossed the summit on September 24, and there was a depth of ten inches of snow everywhere with drifts up to three feet in all the depressions. I should suppose it to have been blocked for the season about three days after we crossed. This last season was considered a very bad one all through, but on one occasion at least this summit was impassable for horses as early as September 19. The difficulty of all travelling with horses in that country arises from the impossibility of waiting for a day if bad weather should come on. Once the snow commences to fall, it may keep piling up day and night and it becomes a case of travelling in difficulties to-day or incurring far greater difficulties to-morrow. As the end of a season draws on it is not at all a pleasant thought to know that certain summits must be crossed on the way out, more especially as these summits are often far in the rear, and it is not known what is occurring on them, whether they are free of snow or daily becoming more blocked up.

June 25 to September 22 are about the limiting dates between which it is fairly certain horses can cross Glacier summit, although in many seasons this may be extended to a period from June 20 to October 5.

The Whitehorse route, as a rule, opens two or three weeks earlier and closes about ten days later than the corresponding dates for the Dalton trail. The condition of the summit between Dalton Post and lake Dezadeash is what decides the length of the season. The route has, of course, the great advantage of being entirely in Canadian territory except for a part of the railway journey, over which a survey outfit can be bonded, which is an impossibility by the Haines route.

After reaching the boundary on July 7, it became necessary to get a camp established without delay as far up the Blanchard valley as possible in order that an observation for latitude might be obtained while the trial line, begun last season, was being continued east. The zenith telescope outfit was therefore taken up this valley to a point about ten and a half miles due east of Station "M" on Tatshenshini river. Here Mr. Blanchard Dodge took up his quarters and proceeded to make arrangements for an observation while the rest of the party returned to the main camp.

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Work was commenced on the trial line on July 10, and it was surveyed up to the new observation station on July 18. Meanwhile on the nights of July 11, 12, 14 and 16, Mr. Dodge had obtained a very good latitude observation with the zenith telescope, the probable error of the mean of fifty observations on twenty-two pairs of stars being  $\pm 0.06$  of a second. In accordance with this a point was established on the sixtieth parallel and marked, as usual, by an iron and a wooden post with a stone cairn. This monument is marked "R."

While some of the monuments were being erected on the boundary west of "R," it was necessary to investigate the country to the east in order to find a suitable place for the next latitude observation. East of here the boundary leaves the Blanchard valley and a route had to be found by which horses could travel easterly. On July 20, I found that there was fortunately a very good pass about five miles east of "R," and a mile south of the boundary, leading over into the valley of a large river flowing northeasterly. While this pass was a good one so far as easy grade and freedom from rocks could make it fit for horses, yet on account of its altitude, which was 5,000 feet, it did not form a very attractive feature to have in our rear. It had become evident by this time that the season would be an unusually cold one and there was a considerable chance of this pass becoming blocked with snow early. In fact, at this date some of last winters ice still remained on a small lake at the summit.

From the summit, there was a descent of two thousand three hundred feet in about four miles, to the large river referred to which proved to be the river shown on the maps flowing into Kusawa lake. Its position on the map is, however, about nine miles too far east, and its topography is shown about seven miles too far north. It has been named Kusawa river.

The zenith telescope outfit was taken to the valley of this river on July 24, and a place selected on the banks of a small stream flowing northeasterly as the most suitable place for a latitude observation. This point is called station "S" and is a little over eight and a half miles east of "R." Mr. Dodge remained here to take the latitude observation and as the weather looked as though it intended to keep cloudy for some time, I decided not only to survey the trial line east from the last observation station as far as possible without moving from the Blanchard valley, but also to go back westerly and establish the boundary monuments between stations "M" and "R."

This arrangement was carried out, all the monuments being established by August 7 and camp was then moved easterly from near monument "M" up the Blanchard valley across the pass previously mentioned and down to Kusawa river where we arrived on August 11. The latitude observation at "S" had been completed some time previously and again resulted very well, the probable error of the mean of forty-one observations on eighteen pairs of stars being  $\pm 0.05$  of a second. Two days later the trial line was surveyed up to this new station.

East of Kusawa river it could be seen that the mountains became very much more rugged and lofty than any we had yet crossed and the prospects of getting the zenith telescope farther east looked very doubtful.

On August 20 I went easterly from Station "S" and ascended a high mountain about six miles away which it was evident, for a long time previously, the boundary line would have to cross. From the summit of this mountain, named Mt. Nevin, and which proved to be at an altitude of 7,259 feet, an extensive view was obtained. To the east there was a sudden descent of very nearly five thousand feet in a little over two miles to the valley of a stream flowing northwesterly to Kusawa river. East of this stream the mountains rose like a wall for about two thousand five hundred feet and then formed a confused mass of peaks and glaciers reaching about 7,000 feet. The general position of the valley of Takhini river could be clearly seen about ten miles farther east and as this was the westerly end of that part of the boundary which had been already surveyed, it was necessary to consider if the remaining gap could be completed.

## SESSIONAL PAPER No. 25b

There were two courses. One was to get the zenith telescope up the valley east of Mt. Nevin (it certainly could not be got any farther) and obtain a latitude observation there. This would ensure the survey of the boundary at least as far as this valley, but the delay of taking a new observation would almost certainly leave little chance for completing the line to Takhini river. The other course was to omit this observation altogether and with the time saved endeavour to establish the boundary right through between the monuments on Kusawa and Takhini rivers.

A new observation would involve great delay, not only on account of the bad weather, but because it would necessitate a pack trail being cut out for twelve miles in dense timber which meant taking the whole party ahead and then back again to survey the trial line. On the other hand, if this observation were omitted in an endeavour to complete the whole gap, it might not prove possible to survey a connection across the very rugged mountains to Takhini valley sufficiently precise to warrant its being used to establish the boundary, and this would mean that no part of the line at all would be established east of Kusawa river.

It was, in fact, a case of risking a fairly certain part for a very uncertain whole.

On August 25 when the trial line was surveyed up to the summit of Mt. Nevin and it was seen that a deflection of at least eight degrees to the north would be necessary to continue the line to Takhini valley the risk of trying to establish the whole boundary with such a deflected line as a basis seemed greater than ever. The accuracy of the measurements would be much more important than in the case of a due east line where an error of some extent may occur in distances without appreciably affecting the latitude of the stations. In such a rough area it would be impossible to make sufficiently precise measurements in the short time available even though only an accurate connection, and not a boundary line, were to be surveyed over the last miles to Takhini river, and it was finally decided to make sure of the part and only approximately connect the remainder of the gap.

A pack trail having been cut out for about six miles down Kusawa valley and then for another five miles up the valley of the stream previously referred to, which is called Hendon river, the zenith telescope was set up and arrangements completed for taking an observation on September 1. The trial line was surveyed up to the same point on September 7, a complex triangulation having to be made to get the line down into the depths of the valley.

While waiting for the weather to clear for the latitude observation it was decided to try to make a connection between this point, called station 'T,' and station 'L' on Takhini river. A week's supplies and a small quantity of firewood had been already packed by the men themselves into a kind of rocky valley which formed the end of a glacier and which ran back easterly from the top of the precipitous ascent on the east side of Hendon river, and which was 2,600 feet above the river. The ascent was made between the boundary and the stream flowing down from the glacier about half a mile north of the boundary. On September 8, Mr. Near, myself and five of the party took a small outfit up the mountain and camped for the night.

Next day we packed our outfit easterly about a mile and a half and ascended to the summit of a narrow ridge at an altitude of 6,200 feet which forms the west boundary of the Takhini watershed. There was a steep snowfield down the easterly slope of this ridge with a descent of about eighteen hundred feet into an open bare valley through which a stream flowed easterly to Takhini river. The day was the first fine one we had had for ten days, but it was not without some misgivings as to how we would fare on the return trip that the descent was made into this valley. The same afternoon the traverse was continued to a point about five and a half miles east of station 'T' and we camped at the upper limit of timber, about seventeen hundred feet above Takhini river, and about two miles north of the boundary. That night the weather returned to its former condition and snow fell at our camp at an altitude of 3,600 feet.



Next day while the triangulation was being continued, monument 'L' on the Takhini river was found. The river was easily forded on foot and an old pack trail was found on its east bank. The river does not flow nearly so swiftly as the Tatshenshini or the Kusawa, nor is it nearly so large a stream. It should be easily forded by horses if a place is chosen free of quicksand. The valley is a large one with much timber. Below the boundary two streams join the river on its west side, one on which we had our camp and another, a larger one, nearer the boundary. This last stream comes down from a valley which after the first steep rise from the Takhini appears to open out considerably as it passes to the west of a local high mountain immediately west of Takhini river. West of this valley I think the boundary would cross a round-topped mountain about 6,600 feet high whose surface is a mass of huge boulders and practically unclimbable when the spaces between are filled with snow. The cause of such a condition is not very clear. We encountered many such mountains this season. Between this mountain and Hendon river there is an area of jagged peaks and irregular valleys all more or less filled with glaciers, the course of whose drainage is not very certain.

The connection made between stations 'T' and 'L' substantially follows the route described as taken by ourselves. I had intended to measure out a base line in Takhini valley and check the connection by closing on it, but the weather had been so bad that it became too risky to delay our return. The summit, three miles to the east of our camp, had been almost continually obscured in what looked like fog, but which we knew to mean a steadily increasing depth of snow. On September 12, with ten inches of snow freshly fallen at our camp, we started back and on reaching the snowfield at the summit found a fresh depth of nearly three feet of soft snow, which was steadily increasing. In a driving wind which obscured objects one hundred feet away we climbed up the snowfield and were not sorry to get back to the main camp.

According to this traverse the distance in an east and west direction between stations 'T' and 'L' is almost nine miles.

On our return it was found that a satisfactory observation for latitude had been obtained, the probable error of the mean of eighteen observations on seventeen pairs of stars being  $\pm 0.10$  of a second. It still remained to put in nearly all the boundary posts between there and the Blanchard valley.

The monuments as far as Kusawa river were completed on September 17. On the same day the head packer returned from Porcupine whither he had been sent ten days previously to distribute hay along the Dalton trail for our journey out. He brought back very bad reports of both Glacier and Parton summits, and we had not much time to lose. We crossed the Blanchard next day and having completed the work there started homewards on September 21. We reached Porcupine on September 25 only seeing the last of the snow on the road near Pleasant Camp at an elevation of 900 feet. Last season the snow line was about 3,500 feet on October 1.

Skagway was reached on September 30 and we left for Vancouver on October 2, having taken fifteen of the horses on board directly from Haines. We arrived at Vancouver on October 6 and I reached Calgary on the 10th, having made arrangements to winter the horses at Kamloops.

The most important valleys along the part of the boundary surveyed this season are those of Tatshenshini, Blanchard and Kusawa rivers. The eastern section is much more rugged than the western and it is a rule that the country is much rougher on the British Columbia than on the Yukon side.

While this is actually the case, the contrast is considerably increased by the fact that a person on the boundary when looking towards British Columbia sees only the northerly slopes of the mountains which are filled with snow, while when he looks to the north, he sees only the sides which have been exposed to the sun and he unconsciously concludes that there is no snow there.

From Tatshenshini river to Hendon river there are in all thirty-two monuments indicating the boundary.

## SESSIONAL PAPER No. 25b

Monument 'M' is situated in a dense growth of spruce and is on the east side of Tatshenshini river at an altitude of 2,528 feet, being four hundred and ten feet from the water's edge. From here there is a steep ascent up a bluff forming the west side of Tatshenshini valley, after which the boundary crosses a rough spruce covered plateau for a little over a quarter of a mile, when the land falls abruptly to the valley of Blanchard river, the distance of the two rivers apart being about seven-eighths of a mile.

Blanchard river is seventy-seven feet wide where the boundary crosses it. It comes down from a source about twenty miles to the east and flowing around the southerly end of the high mountain range which follows up the east bank of Tatshenshini river from Dalton Post, it turns through a right angle and crosses the boundary flowing nearly due north, joining Tatshenshini river about two miles farther on. After crossing Blanchard river the boundary runs through an area of spruce timber, the ground rising steadily for about a mile and a half till it reaches the foot of the steep ascent of the mountain range just referred to. There are five boundary monuments in all between Tatshenshini river and the summit of this mountain. The sixth is on the summit at an elevation of 5,658 feet. From here there is a descent of 1,326 feet to a monument standing on the top of the easterly bank of a small stream flowing southerly after which there is a rise for nearly a mile to the next monument at an altitude of 5,090 feet. The boundary now passes obliquely down the side of the hills forming the north side of Blanchard valley, the last four miles before reaching 'R' being almost at the bottom of the valley. Along this northern slope and in the valley there are seven monuments, there being fourteen in all in the ten and a half miles between 'R' and 'M.' These monuments consist of an iron post driven flush with the ground, defining the boundary. The position of the iron post is shown by a wooden post planted beside it and standing as a rule about four and one-half feet out of the ground and surrounded by a circular cairn of stones about seven feet in diameter and four feet high. The posts are numbered in sections, the number on the post being preceded by the letter which indicates the monument where the nearest latitude observation was taken to the east and succeeded by the letter which indicates the monument where the next observation for latitude was taken to the west, the lettering and numbering being read from the top of the post downwards. The first monument west of monument 'R' is marked 'R.1.M' and the next one to the west is marked 'R.2.M,' and so on, the numbering of the posts being from the east towards the west in all cases.

The upper part of Blanchard valley, that is to say, the four miles westerly from 'R,' is about three-quarters of a mile wide and bare of timber along the river, although there are a few groves of spruce on both sides of the valley higher up its sides. There is a good pack trail along the north bank of the river which is kept well worn by the bears, this valley being apparently the original home of the brown bear. In this upper valley the current is not very swift but there are so many boulders that care has to be exercised in fording it with horses. Where it flows around the mountain range previously mentioned the river follows a tortuous course in a narrow deep valley thickly timbered and cannot as a rule be forded, although we found a fairly good ford for the horses a little above a well marked cut-bank which occurs on the south side of the river about half a mile below where the river enters the heavy timber. The river can generally be forded on foot lower down where it crosses the boundary. The mountains on the north side of Blanchard valley are generally round-topped. Those south of the valley are much higher and more rugged.

East of 'R' the line crosses a moderate ascent as it leaves the valley of the Blanchard and at an altitude of 4,600 feet a wide rough kind of plateau covered with turf is reached extending easterly for about two and a half miles. There is one boundary monument about three-quarters way up the first ascent from 'R' and four monuments are placed on the plateau. At the east of the plateau a wide rocky valley turns off to the southeast leading up to the pass while the boundary line crosses the southerly



shoulder of a local range forming the northeasterly side of the pass. There is no monument on this shoulder, but one stands in the pass about half a mile before its summit and would be reached by a person travelling easterly. From the top of this mountain there is a steady descent to Kusawa river, the boundary being defined by two monuments before 'S' is reached.

The monuments in this section are numbered 'S. 1 R.,' 'S. 2 R.,' &c., from east to west.

Kusawa river is a large stream, considerably larger than Tatshenshini at station 'M.' It is a bad river for horses to cross, there being a large number of boulders whose position cannot be seen owing to the glacial drift in the water. We forded it just below an island and about three-quarters of a mile north of the boundary. In the latter part of August it was about as deep as a horse could ford. The river apparently rises a long way to the south and comes down through a wide valley much broken by small hills and rocky bluffs leading up to the steep slopes of the mountains on either side. North of the boundary the valley is not so rough and is thickly timbered with spruce and jackpine with scattered poplar. Winds blow with terrific violence nearly every day in this neighbourhood. The elevation of the river where it crosses the boundary is 2,591 feet. There is a monument on its west bank.

East of the Kusawa river there is a steep rocky bluff seven hundred feet high and then the boundary crosses a rough country for three-quarters of a mile to the foot of a sharp high range sloping steeply to the north. Two monuments indicate the boundary between Kusawa river and the foot of the range. The altitude of the crossing of the range is 5,789 feet. From there a precipitous descent of nearly two thousand feet occurs into an open valley in which a small stream flows northwesterly to Kusawa river. The crossing of this valley is at an elevation of 3,866 feet, well above timber limit. There is good feed for horses in the valley which extends about a mile and a half north of the boundary after which there is a steep descent through timber to Kusawa river. The stream rises in a very large area of glaciers about four miles south of the boundary. A monument stands in the valley about four hundred and seventy feet west of the stream.

There is a local precipice twelve hundred feet high on the east side of this valley where the boundary crosses it, a monument being placed about three hundred feet east of its summit. There is then a long steady rise of another two thousand three hundred feet to the summit of Mt. Nevin, where the altitude is 7,259 feet, the monument on its summit being the highest point on the boundary between Tatshenshini and Takhini rivers. A large section of the mountain appears to have broken away at some former period and to have fallen into the valley below, there being a huge semicircular cavity along its northeasterly face which is occupied by a snowfield. From the summit of this mountain there is a fall of four thousand eight hundred and sixty feet into the valley of Hendon river in which stands monument 'T' at an elevation of 2,407 feet. The boundary posts in this last section are marked 'T. 1 S.,' 'T. 2 S.,' &c., from east to west.

Hendon river has a slow current. It rises in a glacier about two miles south of the boundary and follows a fairly straight course between lofty and precipitous mountains on both sides for a further distance of about seven miles, to its junction with Kusawa river. There are several lakes in the valley formed by rock slides having blocked up the course of the river. Timber extends along the banks of the river up to the boundary, but it is generally of small size.

The general elevation of the upper limit of spruce between Tatshenshini and Takhini rivers is about 3,300 feet although isolated trees may occasionally be found up to 3,600 feet. Poplar is rare and keeps well below the limit of spruce.

Except the timber encountered in Blanchard valley near Tatshenshini river and that on the east bank of Kusawa river, the boundary line does not actually intersect any timber in the whole thirty-six miles from Tatshenshini to Takhini valley.

## SESSIONAL PAPER No. 25b

The season along this section of the boundary and farther south was a very cold and short one, beginning later and closing earlier than last season. Although the average elevation of camp was only 3,300 feet the temperature fell below freezing point on thirty-six nights between July 1 and September 23. The mean temperature in the shade at two o'clock on the afternoon was  $59^{\circ}$  in July,  $54^{\circ}$  in August and  $47^{\circ}$  in September, the mean minima at night for these three months being  $34^{\circ}$ ,  $39^{\circ}$  and  $29^{\circ}$ . Though we had not much rain yet the sky was generally densely clouded and the low average temperature resulted in snow frequently falling when it would have only rained in most seasons.

The immediate cause of the cloudiness during the season was the prevalence of a south wind from the coast. As we were about on the summit of the high land and moreover had a vast area of glaciers a few miles south of us, we had fogs and clouds while the interior of the Yukon had a very fine summer. A northerly wind during the summer always brought fine weather.

In concluding this report it is hardly necessary for me to point out the great value of the assistance given by Mr. Blanchard Dodge. His work this season more than confirmed the high opinion I formed of his abilities during last season.

Mr. Percy Near, the second assistant, also rendered great aid in the transit work and in the details of camp life.

The other members of the party showed more than usual interest in their work and especially was such the case in the conduct of those who were engaged on the severe trip when making the connection between Hendon and Takhini rivers. Not a few men would have refused to remain so long in such a risky situation.

I have the honour to be, sir,

Your obedient servant,

J. N. WALLACE, D.L.S.

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## SURVEY OF PART OF YUKON-BRITISH COLUMBIA BOUNDARY.

TEMPERATURES DURING SEASON 1908-09.

Date.	Place.	Altitude.	7 A.M.	2 P.M.	8 P.M.	Minimum at Night.	Weather.
June 1.....	Porcupine, Alaska.....	800	43	60	50	25	Fine.
" 2.....	".....	800	49	67	50	33	"
" 3.....	".....	800	54	70	53	31	Fair.
" 4.....	".....	800	54	64	52	36	"
" 5.....	Pleasant Camp, B.C.....	1000	56	66	50	40	Fine.
" 6.....	".....	1000	48	52	48	40	Rain.
" 7.....	".....	1000	50	66	46	33	"
" 8.....	".....	1000	52	62	47	25	Fine.
" 9.....	".....	1000	49	64	46	32	"
" 10.....	".....	1000	58	69	51	39	"
" 11.....	".....	1000	60	66	50	40	"
" 12.....	".....	1000	58	64	50	42	Fair.
" 13.....	".....	1000	50	62	49	40	Rain.
" 14.....	".....	1000	52	60	49	37	Fine.
" 15.....	".....	1000	58	64	54	39	"
" 16.....	".....	1000	57	68	50	42	"
" 17.....	".....	1000	58	62	52	37	"
" 18.....	".....	1000	60	67	52	35	"
" 19.....	".....	1000	56	72	57	37	"
" 20.....	".....	1000	54	71	58	42	"
" 21.....	".....	1000	58	71	58	42	"
" 22.....	Rainy Hollow, B.C.....	2500	51	65	60	43	Fair.
" 23.....	".....	2500	49	73	57	48	Rain.
" 24.....	".....	2500	53	66	56	45	Fair.
" 25.....	".....	2500	57	68	48	42	"
" 26.....	".....	2500	48	55	47	42	Overcast.
" 27.....	".....	2500	45	60	50	40	"
" 28.....	".....	2500	50	62	51	30	"
" 29.....	".....	2500	50	52	47	43	Rain.
" 30.....	Glacier Camp, B.C.....	3050	47	62	53	43	"
July 1.....	".....	3050	53	55	50	43	Fair.
" 2.....	".....	3050	54	57	47	41	"
" 3.....	".....	3050	47	58	49	35	Fine.
" 4.....	Bear Camp, B.C.....	3050	51	60	50	37	"
" 5.....	".....	3050	52	55	46	37	Overcast.
" 6.....	".....	3050	46	50	42	30	"
" 7.....	Blanchard Valley.....	3250	43	55	42	31	Fine.
" 8.....	".....	3250	47	59	45	38	"
" 9.....	".....	3250	45	58	44	32	Overcast.
" 10.....	".....	3600	46	56	44	39	"
" 11.....	".....	3600	50	57	56	24	"
" 12.....	".....	3600	52	66	58	37	Fine.
" 13.....	".....	3600	56	74	59	37	"
" 14.....	".....	3600	60	80	60	30	"
" 15.....	".....	3600	51	70	54	42	"
" 16.....	".....	3600	57	70	50	30	"
" 17.....	".....	3450	51	60	53	45	"
" 18.....	".....	3450	48	50	40	36	Overcast.
" 19.....	".....	3450	45	47	45	31	"
" 20.....	".....	3450	45	56	44	26	"
" 21.....	".....	3450	54	58	46	42	"
" 22.....	".....	3450	44	59	40	35	Fair.
" 23.....	".....	3450	42	56	44	35	Rain.
" 24.....	".....	3450	41	54	44	30	"
" 25.....	".....	3450	43	52	45	29	Fair.
" 26.....	".....	3450	45	56	50	40	Rain.
" 27.....	".....	3450	48	54	51	35	Fair.
" 28.....	".....	3150	52	62	50	31	Fine.
" 29.....	".....	3150	45	60	50	40	"
" 30.....	".....	3150	47	54	51	29	Fair.
" 31.....	".....	3150	47	62	50	36	Fine.
Aug. 1.....	".....	2600	44	51	45	39	Rain.
" 2.....	".....	2600	42	51	44	40	Fair.

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SURVEY OF PART OF YUKON-BRITISH COLUMBIA BOUNDARY—*Con.*TEMPERATURES DURING SEASON 1908-09—*Continued.*

Date.	Place.	Altitude.	7 A.M.	2 P.M.	8 P.M.	Minimum at Night.	Weather.
August 3.....	Blanchard Valley.....	2600	46	56	48	41	Rain.
" 4.....	" .....	2600	49	65	49	28	Fine.
" 5.....	" .....	2600	48	62	48	25	"
" 6.....	" .....	2600	51	52	47	42	Overcast.
" 7.....	" .....	2600	47	58	50	42	"
" 8.....	" .....	3450	50	56	46	35	Fine.
" 9.....	" .....	3450	50	59	45	26	Overcast.
" 10.....	Near Pass.....	4500	36	62	42	30	Fair.
" 11.....	Kusawa Valley.....	2700	42	63	54	43	Fine.
" 12.....	" .....	2700	57	66	56	42	"
" 13.....	" .....	2700	56	53	50	46	Overcast.
" 14.....	" .....	2700	50	56	46	37	Fair.
" 15.....	" .....	2700	44	56	45	43	Overcast.
" 16.....	" .....	2700	46	57	44	42	"
" 17.....	" .....	2700	44	54	47	46	Rain.
" 18.....	" .....	2700	52	56	48	43	Overcast.
" 19.....	" .....	2700	46	60	47	29	Fine.
" 20.....	" .....	2700	45	57	50	42	Fair.
" 21.....	" .....	2600	46	52	50	40	"
" 22.....	" .....	3700	47	50	47	40	"
" 23.....	" .....	3700	45	50	45	39	"
" 24.....	" .....	3700	42	56	46	34	"
" 25.....	" .....	3700	42	50	45	40	Fair.
" 26.....	Hendon River.....	2100	45	59	54	41	Overcast.
" 27.....	" .....	2100	46	65	56	48	"
" 28.....	" .....	2100	50	58	46	38	Rain.
" 29.....	" .....	2100	51	54	50	44	Fine.
" 30.....	" .....	2100	48	57	55	46	Overcast.
" 31.....	" .....	2100	51	56	51	44	Rain.
September 1.....	Hendon Valley.....	2400	49	50	47	43	Overcast.
" 2.....	Hendon River.....	2400	44	49	47	44	"
" 3.....	" .....	2400	46	51	47	44	"
" 4.....	" .....	2400	44	48	46	38	"
" 5.....	" .....	2400	43	45	38	32	"
" 6.....	" .....	2400	44	42	36	29	Snow.
" 7.....	" .....	2400	33	40	37	26	Overcast.
" 8.....	" .....	2400	34	45	38	24	"
" 9.....	" .....	2400	34	52	32	30	Fine.
" 10.....	" .....	2400	34	44	38	35	Rain.
" 11.....	" .....	2400	36	46	40	32	"
" 12.....	" .....	2400	34	40	39	33	"
" 13.....	" .....	2400	36	42	38	34	Snow.
" 14.....	Kusawa Valley.....	3700	38	40	31	22	Fine.
" 15.....	" .....	3700	30	39	37	29	"
" 16.....	" .....	3700	34	38	37	36	Snow.
" 17.....	" .....	2600	41	46	40	39	Rain.
" 18.....	Blanchard Valley.....	3450	44	48	34	28	Fine.
" 19.....	" .....	3450	33	39	34	20	Snow.
" 20.....	" .....	3450	33	46	27	26	"
" 21.....	" .....	3450	28	..	26	28	"
" 22.....	Bear Camp.....	3950	26	..	27	16	Fine.
" 23.....	Glacier Camp.....	3050	29	39	31	30	"
" 24.....	Rainy Hollow ..	2500	30	36	37	30	Snow.
" 25.....	Porcupine, Alaska ..	800	30	..	33	30	Fine.
" 26.....	Wells, Alaska ..	300	32	..	33	32	"
" 27.....	" .....	300	33	39	35	30	Snow.

## APPENDIX No. 47.

## REPORT OF JAS. WARREN, D.L.S.

MISCELLANEOUS RESURVEYS IN SOUTHERN SASKATCHEWAN.

WALKERTON, Ont., February 20, 1909.

E. DEVILLE, Esq., LL.D.  
Surveyor General,  
Ottawa.

SIR,—I have the honour, in accordance with my instructions dated April 18, 1906, to submit the following general report on my survey operations during the season of 1906.

I left home about the end of May and proceeded to Moosejaw where I was to get my outfit together. After having the horses brought in from their winter quarters I decided to move to Maple Creek station by train as there was so much rain that the roads and trails would be very heavy to travel. On our arrival there we were delayed several days on account of rain. After getting camped I proceeded with the resurvey of township 22, range 28, west of the third meridian.

I next completed the resurvey of township 21, range 28 and townships 21 and 22, range 27, and then retraced townships 11 and 12, ranges 25 and 26 that were allotted to me in the season of 1905, but had not been completed. I began the work in these townships on July 25 and completed it on September 5. From here I moved to township 14, range 30, west of the second meridian to make a retracement survey. Having completed this fractional township I moved east to township 14, range 19 to subdivide into quarter sections the beds of two dried up lakes. I found the lakes all dry except a portion of sections 10 and 15.

From this township I proceeded to township 16, range 15 to rectify a discrepancy in the subdivision of that township. I found on my arrival there that some of the owners of the land would not consent to any change. They had signed a petition stating that they wanted a resurvey made but they declared that their names were got by misrepresentation. I therefore had to abandon the work there, and proceeded to township 19, range 24 to make some resurveys, which were completed about October 9.

On completing this work I made arrangements for wintering the horses and storing the outfit, and left for home.

I have the honour to be, sir,  
Your obedient servant,

JAMES WARREN, D.L.S.

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## APPENDIX No. 48.

## REPORT OF JAS. WARREN, D.L.S.

SUBDIVISION IN SOUTHERN ALBERTA.

WALKERTON, Ont., February 18, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour in accordance with my instructions, dated April 23, 1908, to submit the following report on my surveying operations during the past season.

I left home on May 6 for Calgary where I was to collect my outfit. The weather was so very wet that it delayed operations in getting the camp and transport outfit under way. I found the horses in good order, having been well wintered, and they accordingly stood the season's work very well. After some delay we left Calgary on May 18 to commence work on part of township 22, range 5, west of the fifth meridian. We arrived at this township on the 20th. The trail was very wet and we could make but slow progress, yet we got through without any serious mishaps, except a few unpleasant adventures in sloughs and muskegs, just enough to get us used to what was coming.

We had no trouble in locating our work as some of the adjoining work had been done recently and we had no trouble to connect our work with what had been previously done. The weather was very wet for about three weeks, so much so that we were not able to work more than two or three days in the week. We completed the part of this township required, but as Elbow river was so deep and rapid owing to the incessant rains we continued work for a few days longer so as to allow the flood to subside. As soon as the river was safe to ford we crossed into township 23 range 5 just north of where we were working and completed the subdivision of that part of the township allotted without any material difficulty. After completing this township we made arrangements to traverse Willow creek in township 14 range 1. Owing to the floods, many of the bridges were carried away and the rivers difficult to cross, so we had to go around by Calgary. We left Calgary on June 29 and reached Willow creek in good time, after a few mishaps and breakdowns on the way. We completed the traverse of the creek on July 16 and at once moved camp into township 13, range 2, arriving there on July 17.

Our first work was to run the north boundaries of sections 33, 32 and 31, which we did by producing the already established boundary of sections 34, 35 and 36. After completing this outline we proceeded to the southwest corner of the township where we took an observation, and ran due north to meet the north boundary already run, but on arriving at the corner we were over four chains too far east. We suspected that the measurement of the base line must be out, so we chained easterly from the southwest corner of the township along the line already run. After chaining one mile after another we found discrepancies that in four and one-half miles amounted to over four chains.

I then telegraphed to the Department stating the above facts and asking for instructions. In reply I was directed to resurvey the base line across range 2, making all quarter sections 40-37 chains so as to make up the shortage in range 2, and also a

shortage in range 1. On arriving at the southwest corner we took another observation and ran due north making all quarter sections forty chains, this chainage went past the line already run at the north boundary of section 3, and also to the west. This chainage necessitated the resurvey of the north boundaries of sections 31, 32 and 33, which was done. After establishing the east boundary of township 13, range 3, we subdivided all the available land for settlement in the remainder of the township. I may say that there were a great many squatters on the available land, who hope to make for themselves good comfortable homes on the land chosen. I may state here that owing to a difference found in the bearing of the base line in range 2, we had to recut the whole distance of six miles, which difference affected range 3 as well, as the lines did not meet at the southwest corner.

As I had to produce the base line across range 3, I ran three miles westerly from the southwest corner of the township but as the mountains were so high and no pass by which we could cross I had to go south and enter the Livingstone by 'the gap' and went north to the north boundary of township 12 from which we connected with the line already run for three miles; I then produced it across sections 33, 32 and 31, making all these quarter sections forty chains. On completing the base line in range 3, I produced it across range 4, having first taken an observation at the northeast corner of township 12, range 4.

From the northeast corner of township 12, I ran the eastern boundary of that township to the southeast corner of the same. I then ran two miles westerly along the north boundary of township 11, range 4, also one mile easterly along the north boundary of township 11, range 3. From this corner I ran south along the east boundaries of sections 31, 30, 19, 18, 7 and 6. I also ran the north boundary of section 7 in this township and the north boundary of sections 11 and 12 in township 11, range 4, in order to locate the north boundary of the west half of section 11. From the southeast corner of section 6 in township 11, range 3 I ran a traverse line into township 10, range 4, in order to locate the east boundary of section 22 in that township, which completed the work in the Livingstone valley.

We now moved out to Cowley with our outfit on December 29 and disbanded the party on December 31. In the meantime I had arranged for the wintering of the horses and the storing of the outfit.

After completing these arrangements I went to Calgary, and from there went on to Reed lake in townships 16 and 17, ranges 8 and 9, west of the third meridian. I found the ground too frozen to attempt doing any work there, and on advice from the Department I abandoned any further work and arranged to return home, where I arrived on January 9, 1909. Some of the country surveyed is well fitted for ranching purposes there being good feed and plenty of hay in many places. The water is beautiful, there being many fine streams from the mountains of the purest and best of water, which abound with speckled and rainbow trout of the finest quality.

I have the honour to be, sir,

Your obedient servant,

JAMES WARREN, D.L.S.



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## APPENDIX No. 49.

## REPORT OF A. O. WHEELER, D.L.S.

EXAMINATION OF LANDS IN THE RAILWAY BELT, B.C.

OFFICE OF TOPOGRAPHER,

CALGARY, ALBERTA, February 27, 1909.

E. DEVILLE, Esq., LL.D.,  
Surveyor General,  
Ottawa.

SIR,—I beg to submit, herewith, my report dealing with the classification of undisposed of lands within the railway belt in the province of British Columbia. The survey was for the purpose of ascertaining what parts of the said undisposed of lands would come under the following heads, viz.: fruit lands, grazing lands, timber lands and worthless lands.

In accordance with your instructions, three parties were placed in the field, one, in charge of M. P. Bridgland, D.L.S., worked in the Columbia valley, north and south of Golden; one, in charge of H. G. Wheeler, worked in the Columbia valley, north and south of Revelstoke, and the third, in my own charge, worked in the vicinity of Shuswap lake. Reports from the gentlemen in charge of the Golden and Revelstoke parties are submitted herewith. They give details of their operations and the results obtained.

Having organized and started the parties at Golden and Revelstoke, I proceeded with my own party to Sicamous, where horses and camp outfit had already been sent. It was found that horses could not be used around the lake, owing to the rough and rocky shores, so they were transported to Canoe point and left where there was convenient pasturage. Boats at Sicamous are difficult to obtain, but arrangements were made to rent a small one from the lessee of the Canadian Pacific Railway hotel at the place. In addition, the party had a small acme canvas canoe. This transport was wholly inadequate for the long distance that it was necessary to traverse over the several arms of Shuswap lake, and had it not been that I was fortunate enough to render a service to the Sovereign Lumber company, operating at the head of Anstey arm, through locating some of their timber boundaries and who, in return, placed their gasoline launch at my disposal for moving camp, at a charge for running expenses only, there would have been great difficulties with the transport of camp and supplies.

The period from July 21 to July 26 was spent looking over lands on Canoe point not far from Sicamous. Camp was then moved to the head of Anstey arm and work carried on there until August 9. From that date until August 31 the examination of lands was continued on both sides of Anstey arm. No township or section corners have been placed on the shores of the arm, so it was found necessary to make a triangulation to locate the areas of lands examined, and also a chain and compass traverse of the water fronts of such areas. The triangulation was tied on to the township section corners established by J. E. Ross, D.L.S., at Cinnemousun narrows.

During this period, I visited Golden and Revelstoke to ascertain how the gentlemen in charge at those points were progressing and to make further arrangements for their work.



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On September 1, camp was moved to the narrows and work carried on in the vicinity until the 7th, when a move was made to the head of Seymour arm. This work engaged the party until October 8. Golden and Revelstoke were again visited in connection with operations in those localities.

From October 9, until November 25, lands adjoining the portion of Shuswap lake known as 'the long traverse,' extending westerly from the narrows to the main outlet, were examined, particularly in the localities of Blind bay, Notch hill, White lake, and Meadow, Manson and Ross creeks, joining the lake on the north shore of 'the long traverse.'

Winter is now setting in, and travelling by boat, owing to high winds, on the lake, became very uncertain. Moreover, the area surrounding the lake where undisposed of agricultural lands might be found to any appreciable extent had been examined, so the party was brought in and paid off. Owing to heavy snowfalls in the Golden district, and the work having been finished in the Revelstoke district, the other two parties had been paid off on the 16th and 17th of November.

In conducting the examinations the following methods and instruments have been employed:—When the lands examined were situated within surveyed territory the survey lines were traced and the sections traversed in a sufficient number of directions to enable an intelligent report to be prepared upon their classification. In unsurveyed territory, triangulations, traverses and approximate production of the township subdivision lines were made to locate the areas reported upon.

For triangulation work a three-inch Troughton and Simms transit-theodolite was used, and for traverses a four-inch surveying compass, a sixty-six foot chain and a stadia rod.

For the land examinations direction was obtained from prismatic and pocket compasses, and distance by the chain and by pacing with the assistance of a tally-register. Elevations above the respective levels of Shuswap lake and Columbia river in the several localities were computed by means of aneroid barometers carried by the examiners and checked for fluctuation of atmospheric pressure by stationery aneroids read at the camp every two hours throughout the day. Thermometer readings were taken at the same time as the readings of the stationery aneroids and maximum and minimum thermometers recorded the highest and lowest temperatures daily. During the months of October and November temperature readings of Shuswap lake were obtained. Tables of these readings are annexed.

#### DESCRIPTION OF LAND AROUND SHUSWAP LAKE.

For the purposes of agriculture, the climatic conditions of the Columbia valley render it of very special value, on account of its mildness and humidity. The vapour currents crossing the continent from the Pacific ocean, on reaching the high lands of the Gold and Selkirk ranges, rise, and, cooling rapidly, deposit their moisture along these watersheds. Then sweeping swiftly downwards into the valleys below they become heated, and a chinook effect is produced which creates a climatic condition particularly adapted to the successful cultivation of fruits, vegetables and fodder crops. Joined to this the humidity and mildness of temperature produced by the large body of water flowing and spread out in the form of lagoons in the Columbia valley, render it of special value for the purposes named. This is shown by the tropical luxuriance of growth of the natural flora and the abundance of small wild fruits that may be found.

The swift flowing river, fed by hundreds of silt-laden mountain torrents has, through its long course, carved a way from level to level, creating terraces of bench lands and piling up alluvial flats, now densely timbered. These flats and benches will, when cleared and made fit for cultivation, be very valuable replacing the great wealth that now stands upon them in the large tracts of magnificent merchantable timber with which they are still clothed in many localities.

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The tropical growth of cedar, Douglas fir, spruce, hemlock and minor vegetation in the Columbia valley is more apparent above and below Revelstoke than above and below Golden, because the precipitation on the western slopes of the Selkirks is greater and the valley is at a lower altitude. This abundance of moisture in conjunction with the tropical heat of the sun, intensified in the deep trough of the valley, tends to produce the luxuriance of flora here found. The same effect, though not to so great a degree, is seen above and below Golden. The causes that have produced such a magnificent natural growth will be found equally beneficial in the interests of the settlers who are now making their homes in the valley.

Notwithstanding, it is doubtful whether cultivation on the benches can be brought to a high state of perfection without the artificial application of water, for the great heat in summer, so efficient in the maturing of growth, dries out the soil and counteracts its own influence. This condition is more clearly apparent in the Columbia valley near Golden. In the interests of irrigation to these bench and bottom lands, the action of the Department in setting aside as reserved large timbered areas along the watersheds of streams available for such purposes can readily be understood and appreciated.

In the Shuswap lake district conditions are different. The lake stretches out in a number of narrow arms lying in deep mountain troughs resembling fiords. As an almost invariable rule, there is a sharp ascent from the water's edge, which either continues directly up the mountain side for two or more thousand feet, or leads to a bench land or series of bench lands gradually merging with the steep slopes of the mountain. Flats that can be designated as bottom lands are few and are generally found at the mouths of the larger tributary streams where they have, through the course of ages, either filled in the ends of the arms or pushed deltas out into them.

The lake is practically divided into two parts by the Cinnemousun narrows which is less than half a mile wide. On the east side lie Anstey arm reaching northeasterly, the main body of the lake from the narrows to Sicamous and Salmon arm branching westerly from it at the southern end. On the west side are Seymour arm reaching farthest north and slightly beyond the limits of the railway belt, and then the main body of the lake, extending westerly from the narrows and known as 'the long traverse.' From its farthest extremity South Thompson river flows westerly to Little Shuswap lake and from there to Kamloops lake.

At the western end of Salmon arm, entered by the river of that name, a very minor stream, there are considerable areas of very excellent land well under cultivation and producing some fine orchards now bearing quite extensively a first class grade of fruit. Practically all the available land fit for cultivation on this arm is disposed of. At Sicamous two streams enter the lake, Eagle river from the summit of the Gold range, and Shuswap river, the outlet of Mara lake, one of a chain of lakes reaching southwesterly from Shuswap lake. There are still available agricultural lands lying in the valley of Eagle river but the choice parts are disposed of.

Except for a few hundred acres of doubtful utility on Canoe point, at the northeast corner of Salmon arm, there are no undisposed of agricultural lands between Sicamous and the narrows. On Canoe point there are several quarter sections for which entries have been given, where fruits large and small, are now being grown with varying success.

It is a peculiarity of this form of lake that where mountain torrents enter they form a small fan-shaped delta, containing as a rule, a few acres of land that can be cultivated, generally stony. On two of these on the Sicamous stretch, houses have been built and inhabited during the summer.

At the head of the Anstey arm there is a flat extending a short distance northward to Hunakwa lake, a small sheet of water at one time, without doubt, part of the arm. The best portion of the flat is included in a provincial grant of three hundred acres. The remainder is covered by timber berth No. 241. There are some

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bench lands and high lands at the back and east side of the flat, but not of very large area. Most of the remaining possible lands on Anstey arm are bench and high lands, varying in altitude from 100 to 1,200 feet above the lake.

There are very few bottom lands on Seymour arm within the railway belt, perhaps 1,200 to 1,500 acres of good land in all, extending southward to Hunakwa lake, but a considerable portion of it is under timber license. This area slopes gently to Hunakwa lake, being elevated towards the Seymour arm end. There is a small flat at Celista creek, again under timber license, and for the rest, there are only bench lands and high lands, more or less difficult of approach on account of the steep ascent immediately adjoining the lake.

At Cinnemousun narrows a small area is found on both sides that could be cultivated if not too arid when cleared.

Along the south side of 'the long traverse', bench and high lands are found for about twelve miles. This area is rough and broken and only moderately well watered. It is of somewhat doubtful utility. At the west end of the tract, however, in sections 3, 4, 5 and 6 of township 23, range 9, is a patch of some hundreds of acres that can be cultivated to advantage and has no timber of merchantable value upon it. This will undoubtedly be settled as soon as surveyed, for there are already three squatters upon it.

Farther west, at Blind bay, on the slopes of Notch hill, in township 22, range 11 there is now a progressive settlement with almost every quarter section occupied between Shuswap lake and the Canadian Pacific railway, to the south. The settlement is now spreading easterly across White creek in township 22, range 10. There is some good land in the vicinity of White lake which was covered by valuable timber. Unfortunately, during the past summer, a considerable quantity of this timber was burned by forest fires, entailing a very heavy loss, not only of timber, but also of outlay to the lumber company leasing it. Intending settlers have now posted notices in prominent spots through the woods, stating that they have applied for entry on certain quarter sections. Most of the land has been surveyed, but the surveys do not extend to the eastern end of the lake where some suitable land may be found. West of the centre line of township 22, range 11, in the Blind bay settlement, all choice land is disposed of by entries that have been granted. During the past summer a number have been given east of the same line.

On the opposite side of the lake a new settlement has sprung up in the vicinity of Meadow, Manson and Ross creeks. Every available quarter section has been squatted upon, most of the settlers having wives and children. This tract of land has been surveyed in part and it is only where the surveys have not extended that it is unoccupied. There is a postoffice named Celista, and a school is in contemplation, which will be needed, for already four children have been born in the settlement. The Government has recently cut out a road through the settlement, although, I understand that at present only one squatter has received an entry; he has been on his land for fifteen years. The settlement is in townships 23, ranges 9 and 10. The reason no entries have been given is that the entire tract is covered by one of those large reserve areas within which lumber companies are given the right to select blocks of timber. The same restriction applies to Blind bay settlement. In the natural condition of things the land which grows the best timber is that most suited for cultivation and, consequently, there is bound to be a clash between the two interests, apparently the only practical remedy being the removal of the timber.

West of the centre line of township 22, range 11 on the south side, and of Celista settlement on the north side, with the possible exception of a few minor areas, the land available for agricultural purposes at this end of Shuswap lake is either covered by Indian reserves or has been disposed of.

At the head of Seymour arm, also, a settlement is beginning. Several quarter sections have been squatted upon and so far one entry has been given. One of these squatters brought in his wife and family during the fall.

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These settlements have communication with the railway and sources of supply by means of gasoline launches which cover long distances with ease and speed. While every settler has his old fashioned boat, there are always one or more launches ready to supply his needs. There are also a number of steamboats plying on the lake in connection with lumber operations.

Camping at the narrows one notes with surprise the amount of travel to and fro in this wilderness of forest, rock and water, by incoming settlers, by lumber interests, by prospectors and by holiday trappers, sportsmen and artists, for the excellent fishing and delightful scenic beauties of the lake attract attention from many quarters.

It is a great pity that more land suitable for cultivation is not found surrounding Shuswap lake, for the climatic conditions are ideal. Not only does the extended lake surface act as a reflector to radiate heat rays, while disseminating moisture during the summer, but it retards the approach of winter, owing to the time the heated body of water takes to cool. During the past season maximum and minimum temperatures were taken daily of the atmosphere and of the lake during the months of October and November. On October 14, when the second reading of the lake was taken, at 7.15 a.m., the thermometer stood at 38° 30' Fahr., while the temperature of the lake was 53° Fahr. On November 24, the last reading was taken at 8.50 a.m., the thermometer standing at 39° Fahr., when the temperature of the lake was 45° 30' Fahr.

The effect produced by the heated vapour from the water surface rising into the the cold fall atmosphere is very interesting.

Every morning the trough of the lake is filled with a dense mass of cloud reaching down to about 1,200 or 1,500 feet above the surface. This represents the height at which condensation takes place and would suggest the altitude to which the lake influence would extend for the purposes of cultivation. In a few hours the sun breaks up this vapour zone and fills the valleys with most fantastic cloud-shapes, showing picturesquely against the forest-clad sides of the mountain spurs.

Readings of the aneroid barometer were also taken at the several camps every two hours for the purpose of ascertaining the barometric pressure of the atmosphere and of correcting the barometers used while at work, for fluctuation of such pressure.

The climate of the lake, moreover, is subject to local variations. I have known it to rain all day on Anstey or Seymour arm, while on 'the long traverse' the sun shone and no rain fell. In the same manner it would rain at Sicamous and be quite fine a few miles distant on Salmon arm. These diverse conditions are due to the varying narrowness of the several troughs of the lake and the direction in which they lie, furnishing greater or less facility for the sun to reach their depths and disperse the body of vapour filling them.

A map has been prepared and forwarded to the Department, showing by colours lands of three classes that have been examined and considered possible for cultivation.

A schedule also has been prepared and forwarded to the Department giving a short synopsis of the sections or quarter sections examined, stating in general terms the character, the altitude above the lake, the soil, the timber, and the quality as agricultural land.

The lands in the schedule refer only to those that may be considered as possibly available for agricultural purposes either wholly or in part. They seem to be subject to the question of whether there would be sufficient moisture when the timber is cleared off. With the exception of a few flats where the alluvial soil is spread more deeply and where the growth is luxuriant owing to collection of moisture (most frequently grown with large-sized cedar, devil's club and skunk cabbage) they are generally speaking very stony. While stony ground is not prohibitive to fruit growing, judging by what has been seen, it is very porous and would soon dry out if exposed without cover to the heat of the sun. The gauge for utility as agricultural lands has been the possibility of using a plough. The height above the lake for such lands is generally set at 500 feet but it has been carried, where possible, up to 1,200 feet.

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It will be found that a large amount of land embraced, to the early settler looking for choice spots, is quite outside the pale. It is difficult to say what land may not be used in the future. In Switzerland, in the Rhone valley, I have seen every foot of space utilized for the growth of grapes and small fruits by building up retaining walls along the mountain side and spreading mould upon the little platforms thus created, many no wider than ten feet. Whole sides of mountains are thus utilized to produce crops that have a rich marketable value.

With the suitable climatic conditions of Shuswap lake, I should think the industry of small fruits could be successfully carried on in this manner, when it becomes necessary. At Celista settlement, I saw strawberries planted out on little terraces cut from a steep hillside. At Blind bay settlement, one of the settlers, Mr. J. Barnard, took me into his garden on November 6, and cut me several bunches of fine grapes from his vines in the open air. They were delicious. Both these and his peaches had taken prizes at the fruit exhibit held at Salmon arm that summer. In the same garden, tomatoes, marrows and cucumbers were lying about in profusion, as well as other kinds of vegetables and small fruits: It is not a question of whether things will grow, but where to grow them.

There are, however, two other questions of considerable difficulty, that of building roads to reach the cultivable bench and high lands, owing to the sharp acclivity directly at the lake, and the difficulty of obtaining water for domestic purposes, when, owing to this acclivity, the lake water is not available, or where the settler is not on the lake front. In many places bed-rock is so near that digging a well would be impossible and water would have to be piped a long distance. It may prove, moreover, that in many parts, when the forest growth is cleared off, owing to the shallowness of the soil, irrigation may become imperative during the hotter part of the summer, in order to produce crops.

There are doubtless many problems in connection with the cultivation of land in this district, and I have found none more dubious about its success than those who are most concerned and who are reputed to have been most successful.

I have the honour to be, sir,

Your obedient servant,

A. O. WHEELER, D.L.S.

#### REPORT OF M. P. BRIDGLAND, D.L.S., ON THE SURVEY AROUND GOLDEN.

February 18, 1909.

ARTHUR O. WHEELER, D.L.S.,

Topographer,

Department of the Interior.

SIR,—The party arrived at Golden on July 18, and commenced work by looking over the land north of Golden and Kicking Horse river and east of Columbia river. This required one week, and then the work was continued southerly along the east side of Columbia river, baggage being transported by pack train. From July 26 till September 9 all the time was spent along this side except two days on which photographic stations were occupied on the west side of the river, one above Carbonate Landing and another at Jubilee mountain near the south limit of the railway belt, to complete the topographical survey of the eastern side of the valley. The weather throughout was fine and warm and not much time was lost.

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From September 10 to September 27 the lands along the west side of the Columbia between the south limit of the railway belt and Canyon creek were examined. As much of this section was very rough, comparatively little time was spent over it. On September 12 a third photographic station was taken midway between the two previously mentioned. From September 28 to October 23 the work was continued down the west bank of the river to the west boundary of township 29, range 23, near Donald station. Several days were lost during this period owing to heavy rain and snowfalls. Throughout all the work on this side of the river a canoe rented from Mr. Dainard, of Golden, was used for moving camp and was often of use going to and from work.

From October 29 to November 12 work was very much delayed by rains and heavy snowstorms. About four square miles north of the Donald forest reserve and east of Bluewater river were examined and then the work was continued up the valley of the Blackwater to where it becomes narrow. This section was finished on November 12, and on November 13 the party started for Golden reaching there on the afternoon of the 15th.

## GENERAL INFORMATION.

The Columbia valley in the vicinity of Golden is wide, lying between the main range of the Rocky and the Selkirk mountains. Above Golden the lowest part of the valley, varying from a mile to a mile and a half in width, consists of low, wet land nearly all of which is under water through June, July and August. It is really a series of swamps through which the river flows by many tortuous channels. On either side of this flat, steep bluffs rise three hundred to five hundred feet above the river level, and beyond, a series of benches run back to the base of the mountains. Between Golden and Donald the formation of the valley is the same, but the bottom is not so wide and not so swampy.

The land may be divided roughly into two classes, bottom land and bench land; the term bottom land is applied to that part on or near the same level as the river, and bench land to that part lying between the bottom land and the base of the mountains.

Of the bottom lands practically all of the small area not liable to be flooded has been taken up except about 3,000 acres between Golden and Donald. The remainder, which is nearly all slough and swamp, is at the present time of no use except for pasture in the fall and winter. This land, if it could be reclaimed by dyking or dredging, would make the best farm land in the valley. It would probably be too wet and cold for fruit farming, but for vegetables, grain and hay it would be excellent.

On the southwest side of the river the benches are mostly rough and broken and the soil stony with frequent rock outcrops. It is a red clay with much rock, shale and gravel. There are some areas of good land, but they are so small and scattered that they would not be of any great agricultural value, and in most cases where the land is best it would be very difficult to irrigate. The greater portion of this side, south of Golden is old *brulé*, overgrown with small poplar, willow, jackpine and fir. Between Golden and Donald there has been no fire, but all the good timber close to the river has been taken off. There is, however, much new timber growing up, and good timber, principally spruce and fir, remains near the base of the mountains. This is all included in timber berths Nos. 14, 15, 16, 17 and 19.

On the west side of the river, between Golden and the south limit of the railway belt, the benches are not nearly so rough and stony, but they are more or less broken and it is very hard to say which are or are not too rough for cultivation. Directly above Golden the benches are narrow and rough but they start to widen in the south part of township 26, range 21. From here through townships 25, ranges 21 and 20, and township 24, range 19, they continue wide. In township 23, range 18, the valley narrows and there are no benches of any importance. To the north of Golden in



townships 27, ranges 21 and 22 there are about four square miles of good bench land much of it not badly broken. This would make excellent land if it was not too dry, but it would be very difficult to irrigate it.

The soil throughout seems to be of a very similar nature, a red sandy loam or clay usually with a gravel subsoil or occasionally a white clay. These benches are covered principally with small fir, jackpine, poplar, and willow, and when at all open there is an abundant growth of pine grass often mixed with peavine. Near the base of the mountains south of Golden there are many small streams which soon sink below the surface and many of these could be used for irrigation; as these streams would be at their highest in June and July when water is most needed, nearly all the land of value could be irrigated if any systematic attempt were made to do so.

There is very little good timber on the east side of the valley, and most of what there is consists chiefly of scattered fir along the brow of the hills above the river. Most of the merchantable timber has been cut off leaving only a few trees here and there. There is some good timber in sections 25 and 36, township 25, range 21, and sections 30 and 31, township 25, range 20 and also in the northeast quarter of section 15, the southeast quarter of section 22 and the southwest quarter of section 21, township 24, range 19, consisting of timber berth No. 421 and timber berth No. 278.

In the southwest part of township 30, range 24, north of the Donald forest reserve there are about four sections of rolling bench land covered with small poplar, willow, spruce, fir and jackpine. The soil here is a red clay loam and should make good agricultural land if not too dry but it could not be easily irrigated. There is no large timber on this land but farther north there is some good spruce included in timber berth No. 20.

Farther west in township 30, range 24, all the land examined lay along the valley of the Blackwater, five hundred feet and upwards above Columbia river. There are some large beaver meadows along the river bottom and some smaller ones on the benches above. The benches, from one mile to two miles in width, slope gently to the southwest and are not badly broken. The soil is a red clay containing considerable gravel but not enough to render it unsuitable for cultivation. Most of this section could be cultivated, and, if necessary, easily irrigated. There is much fine timber, consisting of large spruce and fir with some pine and cedar, up to thirty inches in diameter, all of which is included in timber berths Nos. 20 and 47.

Up to the present time no attempt has been made to cultivate any of the benches. The lands are harder to reach and harder to irrigate, so the settlers seem afraid to risk anything by trying them. Opinions differ widely as to their utility. Some of the settlers claim that the best land is on the benches, and others state confidently that the benches are of no use except as pasture lands. Much of the soil seems to be as good as that which they are working in the valley and would probably be more suitable for fruit growing.

Fruit farming has not been extensively tried in this valley. Some farmers have had apple trees planted for several years, and while many of the trees are in good condition, many others have been killed. There is no doubt that many of the latter could have been saved by a little care. The season is short and a winter apple such as the Northern Spy will not mature. The Wealthy and Duchess seem to be two of the varieties that do best. The trees bear heavily every year and this tends to make them short lived and also to produce an inferior class of fruit. Plums and cherries have been tried but with poor success. Small fruits such as strawberries, gooseberries and currants have yielded most abundantly wherever tried.

The climate here is a very moderate one. Snow falls early in November and remains until spring, affording excellent protection for trees and plants. The snowfall is not very heavy and many of the settlers south of Golden winter their stock on the marshes and seldom have to do any feeding. In the summer the nights are nearly always cool although the days may be hot. During July and August, 1908, the maxi-

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imum temperature ranged from 70° to 90° Fahr. and the minimum from 40° to 50° Fahr.

A table showing the maximum and minimum temperatures for the time of the survey is submitted herewith; also a schedule of descriptions of the various classes of land by section, township and range has been forwarded to the Department.

I have the honour to be, sir,

Your obedient servant,

M. P. BRIDGLAND, D.L.S.

## REPORT OF H. G. WHEELER ON THE SURVEY AROUND REVELSTOKE.

March 12, 1909.

A. O. WHEELER, D.L.S.,

Topographer,

Department of the Interior.

SIR,—On the arrival of the party at Revelstoke, July 19, they proceeded at once to a camp near Fourmile siding on the Revelstoke and Arrowhead branch of the Canadian Pacific railway. Some time was spent here owing to the considerable amount of good land in the vicinity. Work was pushed southward from this camp but was slow and difficult owing to the swampy and drowned land, the excessive amount of large fallen cedar and the dense growth of devil's club and thick undergrowth.

On August 19 Wigwam siding was reached. Bad weather compelled a stay here until August 26, when camp was moved on towards the railway belt boundary, the south limit of it being reached on August 31.

A return was now made to Revelstoke and, upon the arrival of a row boat hired at Arrowhead, the party took steamer up the Columbia to nineteen-mile flat, where the only settler north of Revelstoke lives, by name, James Hathaway. Work was conducted in the vicinity until September 23, being carried north to the limit of the railway belt. The steamer was then again boarded and a return made to the foot of the Petites Dalles canyon. From this point work was carried downwards on the west side of the river until the south limit of the railway belt was reached on November 14. The party was paid off on the 19th.

Through the kindness of Mr. T. Kilpatrick, superintendent of the Canadian Pacific Railway company at Revelstoke, the party was given special facilities for moving camp along the Revelstoke and Arrowhead branch and conducted the work on the west side of the river by flying camps, using the boat for crossing. North of Revelstoke, except the trips up and down by steamer, the boat was used entirely for moving camp and the purposes of the work.

## GENERAL INFORMATION.

South of Revelstoke the valley of the Columbia is a trough with a width of from one to one and a half miles at its floor and about nine miles from crest to crest of the ridges forming its perimeter. The altitude above sea-level ranges from 1,500 feet at Revelstoke to 8,900 feet at the summit of Mt. Begbie, the highest crest along the valley's run.

The available agricultural area consists of bottom lands and benches extending back from the river, with a maximum elevation of a few hundred feet, to the steep mountain sides. The bottom lands are low rising but a few feet above mean water level, and a large percentage is overflowed at high water. The result is that a portion of this overflow remains in the hollows throughout the summer and swamps are formed,



thus giving to considerable areas a condition of excessive moisture. Owing to the slight elevation above the main river bed these low areas are, moreover, intersected by numerous channels for the high water flow that, at low stages of the river, carry dead water or a very sluggish current and add to the diffusion of moisture through percolation, rendering the soil cold and wet. The portion of the bottom land that is subject to yearly overflow, and where water rests in these swamps, is covered by willow brush and grown with reeds, sedge and coarse grass. It is questionable whether, owing to the slight elevation above the river, it would be possible to reclaim this land sufficiently to convert it into pasture and hay land. Much, however, might be done by dyking and allowing the surplus water to run off instead of collecting in the hollows. Owing to a peculiarity of streams like Columbia river, where the difference in extremes of water level is great (in this case about twenty feet) and very large quantities of silt are carried, the land along the banks is often higher than that farther back, through the silt being piled up along the edges of the bed, and by this means a river may raise its bed above the level of the surrounding country. In such case it would seem impossible to reclaim these overflowed lands. An approximate area for them is set at 3,912 acres.

Beyond the bottom lands, in some instances, benches are found rising back in steps to the steep mountain sides, in others the mountain slopes rise directly from the bottom lands. It is on these bench lands that farming and fruit growing will likely be carried on most successfully. But even here, owing to the intense heat in the valley during the summer months, it is doubtful whether a full measure of success can be obtained without the assistance of irrigation, and water supply for this purpose is not always attainable. The greatest height above the river at which agricultural bench land was found was 700 feet and in most cases it was considerably lower. As a rule the mountain slopes rise swiftly and are steep and rocky. While such slopes might be found suitable for the growth of small fruits, it is unlikely that fruit trees of the larger variety could be grown successfully.

The soil generally is a light sandy or clay loam with a sand or gravel subsoil. An alluvial deposit of silt is found near the river. In the low parts the alluvial deposit is overlaid by a rich vegetable mould. Near the mountain slopes gravel and stones become apparent while parts of the higher benches are often rocky. The soil is very fertile and seems well adapted to fruit growing, vegetable farming and generally to agricultural purposes. Owing to the natural heat in the valley during the summer, combined with the moisture of the lower ground, an almost tropical luxuriance of growth is produced resulting in an impenetrable jungle on the flats which, while it is the very best evidence of the productiveness of the soil, forms a highly detrimental factor to the utilization of the land for agriculture on account of the excessive cost and labour to clear it. Owing to the climatic conditions and the abundance of moisture in the valley bottom caused by the yearly overflow from the river at high water the forest growth flourishes exceedingly and immense quantities of excellent cedar and hemlock have been and are still being obtained for manufacturing purposes.

The prevailing species of merchantable timber are cedar and hemlock and these are met with on every side, in the case of the former as large as six feet in diameter. Cedar cut along the right of way of the railway sometimes measures twelve feet across the stump, but at this size they are mere shells, the whole interior being eaten up by dry rot.

There is much good timber on the west side of the river seen on the slopes of the valley in extensive patches. On the east side, while there is a scattering of good timber throughout, it has been pretty well logged over, and what is left is difficult of approach. Several good patches back on the benches and near the limit of the railway belt are still practically untouched.

Of the other species, cottonwood, poplar, birch and jackpine are most apparent, together with thick undergrowth of maple, alder and willow.

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The land in and about Revelstoke is well suited for vegetable farming, and this is a great source of revenue to the settlers. All classes of vegetables will grow to perfection except those requiring very much sun, such as corn, tomatoes, &c.

Of other kinds of farming, hay seems to be the principal source of revenue. For this purpose the low bottom land and overflowed lands may furnish a good base. The latter are better adapted to it than to pasture lands for the reason that it is only for a month or a month and a half before the snow comes that they are sufficiently dry to admit of cattle roaming over them. In October, a short distance back from the railway, I came to a hay meadow. The hay was three or four feet high and I walked across it right to the mountain slope. In July I had crossed the same ground on a raft. I did not see grain growing to any appreciable extent.

The principal large fruit grown in the valley is apples; being hardy, they seem to thrive best. On visiting H. F. Hayes, one of the most successful growers, last fall, he showed me a wonderful display in his orchard. The trees were breaking down with fruit. The species bearing best were Alexander, Stark, Wealthy, Duchess, Gravenstine, Mackintosh Red and Snow. Plums do not do so well, as they require much more care and the fruit does not ripen so readily. Near Revelstoke, however, some fine specimens were seen, and it is possible that in the future when fruit growing, which is now only in its infancy in these parts, becomes more general, plums, peaches and pears will all be grown with success.

Most of the fruit trees have been set out only a few years ago, and while all the young trees seem to be doing well, it is still a little soon to speak of fruit crops in the vicinity as an assured success.

Wild fruits, such as raspberries, strawberries, huckleberries and saskatoon berries, grow in the greatest profusion and mature perfectly. This would indicate that the tame varieties can be grown with equal success, a surmise borne out by the fact that strawberries grown in Revelstoke last summer carried off first prize at the agricultural exhibit at Salmon arm. Moreover, on Williamson's ranch, adjoining that of H. F. Hayes, small fruits are now being grown extensively and successfully. It would seem possible that the sunny lower mountain slopes beyond the bench lands where the soil is always inclined to greater moisture, could be utilized to advantage in this manner.

Some of the settlers have planted out fruit trees in their holdings on the bottom lands, but it is still a matter of question whether the soil here will not be found too cold and wet to allow the fruit to ripen to perfection. All the successful fruit growing done so far has been on the high and dry bench lands, where artificial watering by irrigation has been possible.

In the Columbia river bed south of Revelstoke there are a number of islands. These are all, with perhaps two or three exceptions, practically unfit for cultivation, being below the high water level of the river and of small area. The two or three referred to are covered by a heavy growth of cedar and hemlock, and still contain trees of lumber value. The others are timbered with large poplar and cottonwood, cottonwood and willow brush and scrub. It is possible this timber may have a pulpwood value for the future. Very few of the islands were seen with a natural growth of hay to any extent. But possibly they could be used for that purpose.

Those holding homesteads are industrious and hard working. Being sure of their holdings, they do not hesitate to cultivate the land and to lay out what little capital they have. On the other hand the squatter is always in a state of uncertainty, not knowing who may reap the reward of his labour. Some of them work hard and deserve consideration. Their one cry is to have the lands under timber lease, upon which there is no merchantable timber, or insufficient to be worked advantageously, released, so that they can get their homestead entries. This is a general complaint throughout the district.

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Of late years a number of Italians have been taking up holdings in the valley south of Revelstoke, not very far from the town. They make good settlers, work every bit of the ground to advantage, and raise good crops. They are very poor and on this account are at a disadvantage. They have, however, large families and will soon very materially increase the area of land under cultivation.

With regard to mosquitoes, it seems absurd to introduce these pests in a report of this nature; and yet they form an evil of considerable magnitude in the valley of the Columbia south of Revelstoke. The fact that it has been satisfactorily disposed of in other countries infested by them proves that it is not a necessary one for all time. As the country clears up, undoubtedly, the evil will be mitigated, but so long as the tracts of swamp land remain as such they will be favourite breeding grounds. It is difficult for people who live in localities where their numbers are few to understand the four months of torture that is endured here by the settlers every summer. No doubt when the settlers increase sufficiently in number, the matter will be taken in hand and the scientific application of kerosene to the swamps will put an end to what is now a serious plague.

At the present time Revelstoke furnishes the principal market for the agricultural produce of the valley, but with the facilities offered by the Arrowhead branch of the Canadian Pacific railway and that company's line of steamboats on the Arrow lakes there seems a good outlet for trade with the cities and towns springing up in the lower Kootenay country, while, when the fruit crops become of sufficient magnitude, there will undoubtedly be a market for them both east and west.

North of Revelstoke the conditions are somewhat different. The valley is much narrower and the river very rapid and difficult to navigate. It flows for the most part between high banks and is often broken by rapids. Owing to the compressed volume of the stream the difference between high and low water is great and here has an average of twenty feet while south of Revelstoke the average is about fifteen feet. The mountain slopes are very precipitous and rocky, especially on the east side.

There are no bottom lands and the land suitable for agricultural purposes consists of benches rising back in steps to the steep mountain sides. They are at an elevation of from forty to five hundred feet above the river. The available area is small. It is estimated at 3,477 acres, of which probably not more than fifty per cent is fit for cultivation. While there are some level flats, the bulk of the bench land is rolling and uneven.

The soil generally speaking is either a rich black loam with a sand subsoil or a rich sandy loam with gravel subsoil, although there are variations from this rule. It is very stony in parts. Taken as a whole it is well suited for agriculture and particularly for fruit growing.

The prevailing timber of merchantable value is hemlock and cedar. The latter grows as large as six feet in diameter. There are millions of feet on the slopes on the west side of the valley. There is also a considerable quantity on the east side, but a good deal of it has been taken off to supply the mills operating at Revelstoke. Both sides of the river are completely covered by timber licenses. For the rest, cottonwood is found along the tributary streams and in low places, and jackpine in sandy spots, while second growth of cedar, cottonwood, hemlock and pine is met with in the old brûlé.

The only settler on undisposed of lands north of Revelstoke, by name James Hathaway, lives on the northwest quarter of section 10, township 26, range 2, west of the sixth meridian, at a place locally known as 'nineteen-mile flat.'

The climatic conditions in the Revelstoke vicinity are exceptional. Owing to the low altitude, about 1,500 feet above sea-level, the coming of spring is comparatively early and the setting in of winter late, making a full period for growth and maturity. In addition the warm chinook effect found in wide valleys bordered by high

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mountain ranges is apparent here. This, together with the large amount of evaporation from the great body of water flowing through the valley, adding humidity to the highly heated summer atmosphere, renders the climate an ideal one for the practice of farming and fruit growing.

In the winter from three to five feet of snow covers the ground and remains steadily until the spring, thus affording the best possible protection to fruit trees and a good supply of moisture for the summer. The mean average precipitation is about thirty-five inches. The valley is perfectly sheltered and there is practically no wind that is to any degree detrimental.

During July and August the maximum temperature ranged from 57° to 94° Fahr., and the minimum from 43° to 60° Fahr.; during October and November the maximum ranged from 31° to 69° Fahr., and minimum from 20° to 50° Fahr. The first frost came on September 23, when it registered 31°. On the 25th it registered 30° and on the 26th 29°. On October 4, it registered 31° and the next frost did not occur until October 16. The September frost was unusual and was universal throughout the mountain regions.

I have the honour to be, sir,

Your obedient servant,

H. G. WHEELER.

TABLE OF MAXIMUM AND MINIMUM TEMPERATURES, VICINITY OF REVELSTOKE, B.C.

During July, August, September, October and November, 1908.

	July.		August.		September.		October.		November.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1.	°	°	82.3	53	75	56	°	50	46	40
2.			72	46	65	52	68	42	46	42
3.			76	52	50	50	72	38	45	44
4.			84	51	74	50.2	58	31	51	30
5.			90	54	72	40	66	42	48	33
6.			92	50	70	39.5	64	42	44	43
7.			94	53	66	51	68	46	48	44
8.			91	51	58	45.5	69	47	51	41
9.			83	54	45.5	41.5	68	46	54	32
10.			86	50	61	42	67	42	42	26
11.			78	46	°	°	61	42	40	29
12.			84	43	74	47.5	50	35	34	22
13.			90	44.5	62	45	62	40	42	31
14.			70	43	68	51	62	41	40	24
15.			°	°	58	51	61	38	31	20
16.			82	°	67.5	48	61	31	34	28
17.			84	48	73	38	52	30	38	23
18.			86	50	74	44	52	30	°	32
19.			°	52	65	46	51	31	°	°
20.			78	54	75	50	44	38	°	°
21.	90	54.2	76	52	69	43	52	37	°	°
22.	92	56	74	51	66	40	52	30	°	°
23.	82.7	59.8	62	58	°	°	53	30	°	°
24.	80	60	62	53	55	35	51	30	°	°
25.	63	56	58	49.5	55	30	52	20	°	°
26.	76.3	43	56.5	46.5	54	29	45	38	°	°
27.	67	47	°	43.5	50	45	45	38	°	°
28.	66.7	52	66	52	52	41	43	32	°	°
29.	74.3	46	68	46	64	45	42	30	°	°
30.	72	48.7	70.3	47	65	36	39	30	°	°
31.	72	55	73.5	48	°	°	42	34	°	°

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TABLE OF MAXIMUM AND MINIMUM TEMPERATURES, VICINITY OF GOLDEN, B.C.

During July, August, September, October and November, 1908.

	July.		August.		September.		October.		November.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1.....	°	°	°	°	°	°	°	°	°	°
2.....					77	47	52	42	52	26
3.....					65	49·5	57	40	51	31
4.....			76	48	74	47	57	27	43	36
5.....			82	47·5	80	36	58	29	.....	34
6.....			85	51·5	82	38	59	32	59	35
7.....			83	52	87	37	58	32	44	34
8.....			75	49·5	.....	55	58	31	.....	34
9.....			83	49	68	42	56	29	43	26
10.....			.....	.....	68	39	64	32	35·5	26
11.....			87	51	66	46	63	30·5	31	21
12.....			78	52	66	47	73	28	27·5	14
13.....			73	40	67	43	63	29	.....	.....
14.....			78	41	68	44	56	48	.....	.....
15.....			79	40	67	56	57	38	.....	.....
16.....			.....	51	57	52	.....	32	.....	.....
17.....			82	41	.....	49	58	27	.....	.....
18.....			84	42	63	31	46	24	.....	.....
19.....			86	46·5	.....	36·5	41	26·5	.....	.....
20.....	85·5	45	87	47·5	68	44	39	31	.....	.....
21.....	90	44	78	49	70	47	.....	31	.....	.....
22.....	91	48·5	.....	57	68	39	.....	.....	.....	.....
23.....	93·5	51	82·5	.....	.....	27·5	41·5	29	.....	.....
24.....	78	49·5	69	42	50	26	.....	.....	.....	.....
25.....	84·5	51	60	46	56	27·5	45	27	.....	.....
26.....	75	.....	60	42	51	27·5	.....	24	.....	.....
27.....	75	41·5	68	34	.....	35	65	28	.....	.....
28.....	76	41·5	.....	48	54	40	40	26	.....	.....
29.....	74	41·5	66	47	64	40	.....	.....	.....	.....
30.....	82	44	71·5	46	63	31	.....	.....	.....	.....
31.....	92	47·5	72·5	47·5	.....	.....	46	31	.....	.....

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TABLE OF MAXIMUM AND MINIMUM TEMPERATURES, VICINITY OF SHUSWAP LAKE, B.C.

During July, August, September, October and November, 1908.

	July.		August.		September.		October.			November.		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Lake.	Max.	Min.	Lake.
	°	°	°	°	°	°	°	°	°	°	°	°
1.				51		49.5	54	48.5		50	38.5	48.5
2.				42	61	56	63	40		50.5	41	49
3.				53.5	64.5	53.5	55	39.5		54	44	
4.			88	56.5	67.5	50.5	50	41		53	41	
5.				59	69	50.5	53	42.5		51	41	50.5
6.				91.5	50	69	51	53.5	43.5	50	42	49
7.				92.3	50	66	55.5	63	43	51	44	46.5
8.				95	47.5		46	58	43	47	38.5	48.5
9.				95	48	47	44	56	46	45.5	33.5	46
10.				86.5	43	62	44	55	44	42	28.5	44.5
11.				74.5	44	65	49	55	43.5	40	23	45
12.				79	51.5	72.5	47	51	43	39	29	45
13.				83	52	65	47	57	47	45	34.5	45
14.				85.5	52	67	41	51	40	54	40.5	44.5
15.				83	61.5	59	40	51	39.5	55	39.5	27
16.				79	52		47	54	38.5	54.5	41.5	33.5
17.				82	50.5		40	50	35	51	44	38
18.				83	53.5	65	44	47	34.5	54.5	49.5	42
19.				81	55	61	42.5	46	39	53	45.5	41
20.				78	58	73.5	50.5	42	35	52	46	40
21.				79.5	56.5	72.5	43.5	44.5	37	51	45.5	36.5
22.				79.5	54	59	41	38	31.5	51.5	44	40
23.	90.5			66	60	51	34.5	43	35.5	50.5		37
24.	83			62	52	55.5	27.5	45.5	37.5	51.5		36.5
25.	63	53		50	47	55.5	27.5	47	37	51		34.5
26.	74	52		60	46.5	54	30	28.5	48	50.5		
27.	73	48		58	47	48.5	41	27.5	43	46		
28.	70	59		63	49	51	40.5	39	35.5	46		
29.	69.5	56		55.5	48	62.5	45.5	45	35	47.5		
30.	78	52		58	49	61	36.5	56	41	49		
31.		52		66	47.5			46	33.5	47.5		

## APPENDIX No. 50.

## REPORT OF W. H. YOUNG, D.L.S.

## SURVEYS IN THE VICINITY OF PINCHER CREEK.

LETHBRIDGE, February 11, 1909.

E. DEVILLE, Esq., LL. D.,  
Surveyor General,  
Ottawa.

SIR,—I have the honour, in accordance with my instructions, dated April 7, 1908, to submit the following general report concerning my survey operations in southwestern Alberta during the past season.

On April 30 I went to the town of Pincher Creek where the transport outfit had been stored. The next few days were occupied in ordering supplies, hiring men and buying additional transport outfit. Upon enquiry I learned it would be advisable to procure pack saddles, &c., which I accordingly did.

On May 5 I left Pincher Creek with my outfit, and after delays on account of rains and poor trails reached section 26, township 6, range 3, west of the fifth meridian, on May 9. Owing to the high water in Southfork river, it was impossible to cross the fords on the usual trail, so we had to keep on the north side of the river. This necessitated travelling over a very hilly and rough trail, which we had to repair at the creeks, and in fact, cut anew in many places to avoid mud-holes.

Township 6, range 3, is very mountainous, most of the lines running over hills more than 1,000 feet above Southfork river. It is practically covered with small timber, jackpine and poplar, burned over some years ago, hence much of it is dead. Only in small patches along the river is the land arable. There is no timber of importance in this township. On sections 6 and 7 a quantity was cut some years ago, but fire killed what remained. In section 8 there are five exposures of coal, totalling about 40 feet, and in the bed of the river in section 15, a small but unimportant seam of hematite occurs. Two varieties of trout are very abundant in Southfork river.

After many delays on account of rains I completed all the lines, except the east boundary of the township, north of the river, and then moved camp to section 1, township 6, range 4, over high and precipitous hills. I then completed the lines in the southwest part of the township. From this camp I also surveyed a portion of township 5, range 3, and found it advisable to move a flying camp south by pack horses. Accordingly I cut a trail to section 30, from which camp I completed the survey of the township. By this time the river had lowered sufficiently to allow us to cross, and so I moved to the east side of township 6, range 3, to the south side of the river and completed the township. There are quite a number of settlers in the township, nine of whom made their declarations.

Township 5, range 3, is covered mostly with spruce along the west boundary, much of the interior having been burned. Black and brown bears and red deer were numerous in this and the adjoining township to the west.

After completing the survey of township 6, range 3, I moved to township 7, by way of the Pincher Creek-Frank trail as far as Burmis on the Canadian Pacific railway, then north by settlers' trails and roads. I surveyed the north and east boundaries of sections 34 and 35. On the north boundary monuments were already established, but not in correct position, so I destroyed them. The north part of this township



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is of little use except for grazing, being partly covered with poplar and willow scrub. I next proceeded to township 7, range 4. This is an extremely rough and mountainous township, abounding in deep canyons and rocky ledges, some timber has already been cut but a little still remains.

I moved my outfit to Pincher Creek en route to township 3, range 30, west of the fourth meridian. On my arrival at Pincher Creek I found instructions awaiting me to complete the survey of township 6, range 2, west of the fifth meridian.

The southerly portion of this township is very mountainous especially in the southwest part, and fit for little else than grazing, but along Screwdriver creek and Southfork river there are many quarter sections suitable for farming. Good crops of oats and wheat, as well as excellent vegetables, were grown here last summer. Coal deposits are numerous in this township.

From township 6, I returned to Pincher Creek, and proceeded south by the Oil City trail as far as Dry Fork post-office, and then in a southwesterly direction over a fairly good trail to section 33, township 3, range 30, west of the fourth meridian.

Part of this township is suitable for farming, but is better adapted for ranching. There is no timber, but immense quantities of willow brush are found. The soil is a light sandy loam and the grass is not too plentiful, but may be cut for hay in the south part of the township. On section 22, a small crop of oats was cut before ripening. Iron claims have been staked in section 12 and the adjoining section. The southwesterly part of the township is a barren waste of rocky mountain peaks. In the last week of September snow fell to the depth of three feet, and this, together with other storms in October, delayed us considerably.

Township 4, range 1, west of the fifth meridian is suitable in parts for farming and a number of settlers there have made declarations.

The southeasterly portion is suitable only for ranching, while mountain peaks occupy the west half and southwesterly part. Upon the completion of that portion of this township which I considered fit for agriculture I proceeded to Pincher Creek, where I stored my outfit for the winter, dismissed my party and departed, arriving in Lethbridge on November 4.

I learned from enquiry here that Keho lake was more of the nature of a muskeg; I therefore decided to investigate this after it was well frozen. I engaged two men and drove to this lake. I found little or no water, but settlers told me that in the spring it floods a great portion of the country. I took measurements to enable me to determine the legal subdivisions which are rendered altogether worthless by water.

I have the honour to be, sir,  
Your obedient servant,

W. H. YOUNG, D.L.S.





# DESCRIPTIONS OF TOWNSHIPS



DESCRIPTIONS  
OF  
SURVEYED TOWNSHIPS  
1908-1909

APPENDIX No. 51.

LIST OF TOWNSHIPS DESCRIBED.

EAST OF PRINCIPAL MERIDIAN.		WEST OF PRINCIPAL MERIDIAN—Con.	
Township.	Range.	Township.	Range.
16, 24, 25, 28	1	23, 35.	20
24, 25.	2	23, 31.	21
18, 24, 25.	3	29, 30.	23
25.	4	26.	24
16.	7	23.	26
20, 21, 22, 23, 24, 25, 26.	8	24.	30
20, 24.	9	29, 30, 31.	31
18.	11		
16.	12		
10.	13		
10, 14, 15	14		
2, 3, 4, 5, 6, 7, 8, 10, 12	15		
12.	16		
12.	17		
WEST OF PRINCIPAL MERIDIAN.		WEST OF SECOND MERIDIAN.	
Township.	Range.	Township.	Range.
24, 25, 26, 27, 23	1	21, 33.	1
24, 25, 26, 27	2	38.	2
24, 25.	3	38.	3
25.	4	37.	5
24, 25.	5	32, 42, 43.	9
25.	6	41, 42, 43.	10
25, 26.	7	41, 42, 43.	11
25, 26.	8	50, 51, 52.	14
25, 26.	9	41, 51, 52.	15
27, 28, 29, 30, 31	10	41, 42, 51.	16
22, 23, 27, 28	11	41, 50, 51.	17
27, 28.	12	50, 51.	18
27, 28.	13	1, 4, 50.	19
27, 28, 29, 30, 31	14	1, 2, 3, 4.	20
30, 31.	15	2, 3, 4, 46, 51.	21
31, 32, 36.	16	1, 2, 44, 46, 49.	22
33, 34, 35, 36.	17	1, 2, 49.	23
28.	18	1, 2, 3, 47.	24
		1, 2, 3, 47, 49.	25
		1, 2, 3.	26
		1, 2.	27
		1.	28

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## List of Townships Described—Continued.

WEST OF THIRD MERIDIAN.		WEST OF FIFTH MERIDIAN.	
Township.	Range.	Township.	Range.
23, 42, 43, 44.....	1	4, 5, 6, 7, 8, 61, 62.....	1
6.....	2	6, 12, 13, 60, 61.....	2
6, 7, 8, 9, 10, 24, 52.....	3	5, 6, 8, 9, 10, 12, 13, 61.....	3
5, 6, 7, 8, 9, 23, 24, 52.....	4	8, 12, 45, 46, 61.....	4
5, 6, 7, 8, 9.....	5	22, 23, 45, 46, 53, 61.....	5
5, 6, 7, 8, 9, 10.....	6	45, 46, 61, 62.....	6
5, 6, 7, 8, 9, 10.....	7	49, 50, 51, 52, 57, 61, 62.....	7
5, 6, 7, 8, 9, 10.....	8	40, 52, 58.....	8
7, 8, 9, 10.....	9	40, 44, 52, 55, 56, 57, 58, 59, 60.....	9
5, 7, 8, 9, 10.....	10	40, 44, 52, 55, 56, 57, 58, 59, 60.....	10
5, 6, 7, 8, 9, 10.....	11	40, 44, 54, 55, 56, 57, 58, 59, 60.....	11
5, 6, 7, 8, 9, 10.....	12	40, 44, 54, 55, 56, 57, 58, 59, 60.....	12
5, 6, 7, 8, 9.....	13	40, 44, 54, 55, 56, 57, 58.....	13
7, 8.....	14	40, 44, 53, 55, 56.....	14
7, 8.....	15	40, 44, 52, 53, 55.....	15
5, 7, 51.....	16	40, 44, 52.....	16
5, 7.....	17	40, 44, 52.....	17
5, 6, 7.....	18	40, 44, 48, 52, 53.....	18
5, 6, 7.....	19	40, 43, 44, 48, 52, 53.....	19
4, 5, 6, 7.....	20	43, 44, 48, 52, 53, 56.....	20
5, 6, 7.....	21	48, 52, 56.....	21
5, 6, 7.....	22	48, 52, 53, 56.....	22
5, 6.....	23	48, 52, 53, 56.....	23
1, 2, 3, 4, 50, 51, 52, 53.....	26	48, 52, 56, 81, 82.....	24
1, 2, 3, 4.....	27	48, 81.....	25
2, 3.....	30	48.....	26
		48, 49, 50.....	27
		48.....	28
WEST OF FOURTH MERIDIAN.		WEST OF SIXTH MERIDIAN.	
59, 60.....	1	79, 80.....	3
1, 2, 3, 4, 5, 59, 60.....	2	80.....	4
1, 2, 3, 4, 5, 59, 60.....	3	77, 78, 79.....	5
1, 2, 3, 4, 5, 59, 60.....	4	19, 20, 21.....	12
3, 4, 5, 59, 60, 61, 62.....	5	19, 20.....	13
59, 60, 61, 62.....	6	19, 20.....	14
3, 4, 5.....	7	19, 20.....	15
3, 4, 5.....	8	18, 19, 20.....	16
3, 4, 5.....	9	21, 22.....	17
63, 64.....	13	20.....	21
27, 28, 29, 30, 31, 32, 63, 64, 65.....	14	15, 16, 23.....	22
27, 28, 31, 32, 63.....	15	20, 23.....	23
27, 28, 31, 32, 41.....	16	19, 20.....	24
27, 28, 29, 30, 31, 32, 41, 42, 43.....	17	17, 18, 19.....	25
27, 43, 44, 60.....	18	16.....	26
32, 44, 60, 63, 64, 65, 67.....	19		
34, 60, 63, 64, 67.....	20		
59, 60, 64, 66, 67.....	21		
60, 64, 67.....	22		
61, 62, 63, 64, 65, 66, 67.....	23		
61, 62, 63, 64, 65.....	24		
62.....	27		
3, 9.....	30		

## DESCRIPTIONS OF TOWNSHIPS.

NOTE.--Numbers of townships are placed in heavy type on the left margin of the pages in the descriptions of townships.

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 1.*

10. The soil in this township is said to be of an inferior quality, but the township is being gradually filled up with a hardy class of settlers who speak in very hopeful terms of their prospects and who will give a good account of their farming operations in the near future. The land has been stripped of whatever forest originally existed on it, and only sufficient timber remains now for fuel, fencing and building necessities of the settlers. There are many large sloughs in this township and water is abundant.—*C. F. Aylsworth, D.L.S., 1908.*

24. This township is situated about twenty-five miles in a northwesterly direction from Hnausa postoffice, on the west shore of lake Winnipeg, and may be approached either by means of what is known as Fisher river road or by way of Icelandic river road from Vidir. Vidir is the nearest postoffice being only about two miles south-east of the township. The character of the soil of this township is chiefly that of a sandy loam underlain by a limestone gravel, or in many cases solid limestone rock. The easterly half of the township is high and comparatively dry, but the westerly portion is largely occupied by an extensive swamp, around which toward the north we found considerable difficulty in making a road. The most westerly mile of the township is composed of a high limestone plateau, which breaks off abruptly toward the east into the swamp already mentioned. This plateau is about fifty feet above the adjoining swamp lands. This township like others in the vicinity has been swept by fire at some time during the past few years and consequently no timber of any value was found. The general character of the surface may be described as 'brulé' containing a few large, dead, standing stubs and many fallen trees. The growing timber is all of very small size, from one to three inches in diameter. The swamp lands, occupying portions of sections 16, 17, 20 and 21 as well as some other localities contain a considerable amount of swamp hay, although during the time of survey, August they were so flooded by the incessant rains as to be almost inaccessible and entirely too wet to admit of cutting. Most of the northeast and easterly part of this township is comparatively high and dry, but a large amount of water was found on the westerly and central sections lying immediately to the east of a pronounced limestone ridge, which occupies the greater part of the westerly tier of sections. No creeks or ponds were met with and no water-power occurs in this township. Judging from the growth of vegetation in this locality I would say that the climate is quite favourable for the pursuit of general farming. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold, forty degrees below zero being about the lowest temperature recorded during the past winter. The fuel supply of this township is limited to the standing dead or fallen timber, which however in some localities is very abundant, particularly in the eastern portion of the township. A large amount of limestone rock outcrops in the more westerly portion of this township and although much weathered and of a very shaly nature where exposed on the surface, it is quite

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

possible that if opened up as a quarry it might yield a fairly good building stone. Other than the limestone no minerals of economic value are known to occur in this township. Small game such as prairie-chicken and ruffed grouse were occasionally met with in this locality, but the only species found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

25. The township is situated at a distance of about thirty-five miles in a north-westerly direction from the village of Hnaua on the shore of lake Winnipeg, and may be most easily approached by means of a fairly good wagon road from that place, Vidir being the next postoffice, from which place it is only about ten miles distant. A large percentage of the soil of this township is of a very rocky character, bare limestone appearing at the surface in very many places. The southwesterly portion of the township is particularly rough and rocky and is scarcely suited for agricultural purposes. The northeasterly part of the township, though rocky in places, contains a large amount of swamp land. The surface of this township is considerably broken and hilly, although no very great elevations occur. The most conspicuous hill in the township has an extreme elevation above the surrounding country of about fifty feet and passes in a northwesterly direction through sections 12, 11, 14 and 15, and is of a very rocky character. The greater part of the township, like others in the locality, has been burnt over within recent years, so that little living timber of any value remains. In some sections there is a large quantity of standing dead timber which, if available for market, would be of very considerable value. The southwesterly part of the township which, as already stated, is of a rocky character, is of a comparatively high elevation and is quite dry, but to the northeast it is quite wet, containing in addition to a large tract of swamp land, a lake of considerable size occupying parts of sections 23, 24, 25, 26, 35 and 36. No timber of any value now remains. This township being of a rather dry, rocky character, comparatively little natural hay was found. Some, however, occurs upon sections 3, 4, 7, 8, 9, 17, 20, 21, 33 and 34. The northeastern part of this township is well supplied with water from a large lake already referred to upon sections 23, 24, 26, 35 and 36. A small creek passes through sections 6 and 7 and during the early part of the summer contains a good flow of fresh water; but this is not constant and was found to be completely dry during the latter part of the season. In addition to the above sources there is also a large surface supply in the extensive muskegs in the northeasterly part of the township. No water-power occurs upon this township. The climate of the locality is similar to that of the other eastern parts of Manitoba, though probably somewhat more moist on account of the proximity of the great lakes both to the east and west. Hard frost sets in about the middle of November sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops; for these were successfully grown during the past summer both in township 25, range 1, west of the principal meridian and at Fisher River Mission station. There is an abundant fuel supply upon this township in the form of dead timber which is still standing in large quantities. This township being of a very rocky nature with many limestone exposures at the surface may at some time furnish stone for building purposes, but as yet no quarries have been opened. No minerals of economic value are known to exist upon this township. The most important variety of game in the vicinity is the moose which is comparatively numerous. Elk or wapiti are also found and black bear are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce-partridge, prairie-chicken and duck, the latter being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

23. This township is situated immediately south of Indian reserve No. 44, which adjoins the southern extremity of Fisher bay of lake Winnipeg. A road, known as the Fisher river road passes from the Mission station at Fisher bay through the northeasterly part of this township in a southeasterly direction to Icelandic river on the shore of lake Winnipeg. By means of this road this township is accessible from either place, except during the wet seasons, when the portion of the road through the south of it is next to impassable. The soil of this township is chiefly of a very stony character and will be more suitable for ranching than for farming purposes. The surface is comparatively level with slight variations in elevation, the higher portions of which are of a rocky nature, whilst the lower ground is occupied by tamarack swamps or muskegs. The surface of the higher country is chiefly covered by small poplar woods, the swampy country by tamarack. A limited quantity of big spruce, tamarack and poplar occurs upon the northeasterly sections of the township immediately adjoining the south boundary of the Indian reserve, but beyond this locality there is no timber of any considerable value. A considerable amount of marsh hay occurs upon sections 1, 5, 6, 15, 16, 17, 18, 21, 22, 24, 29, 30, 31 and 32. The only water supply found occurs in the muskegs occupying parts of sections 13, 14, 15, 16, 17, 21, 22, 29, 30, 31 and 32. No water-power occurs upon this township. The climate of the locality is similar to that of the other eastern parts of Manitoba, though probably somewhat more moist on account of the proximity of the great lakes both to the east and to the west. Hard frost sets in about the middle of November sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two later. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops; these were successfully grown last summer both in township 25, range 1, west of the principal meridian and at Fisher River Mission station. The only kind of fuel found in this township is a limited amount of large timber occupying a portion of the eastern sections of the township, where there is a considerable amount of poplar, jackpine, spruce and tamarack, sufficient for local supply. This township being of a rocky character with many limestone exposures at the surface may at some time furnish stone for building purposes, but as yet no quarries have been opened. No minerals of economic value are known to exist upon this township. The most important variety of game known in the vicinity is the moose which is comparatively numerous. Elk or wapiti are also found and black bear are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce-partridge, prairie-chicken and duck, the latter being very scarce. —J. W. Tyrrell, D.L.S., 1908.

*Range 2.*

24. This township which is situated about twenty miles to the northwest of Hnaua on the shore of lake Winnipeg, is most easily approached from there by way of what is known as the Fisher river road, which passes through the northeasterly sections of the township. During wet seasons the condition of this road is extremely bad, almost impassable, while during dry seasons, or in the winter time, it affords a first class means of transportation. The general character of the surface soil of this township is that of a sandy loam, approaching gravel in many localities and it is underlain in most places by limestone gravel or rock. For the most part the surface of this township is comparatively level, although several gravel ridges occur in it, the most notable of which passes in an easterly and westerly direction through the northern tier of sections and forms a remarkably well defined ridge of about thirty feet in height. In addition to



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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 2—Continued.*

these gravel ridges there is a cliff of limestone about forty feet in height which extends in a northwesterly direction across sections 29, 32, and 31. From the centre of this township and extending about one and one-half miles towards the west there is situated a very extensive, soft muskeg, over which we found it very difficult to make a crossing. Almost the entire surface of this township may be described as what is commonly known as *brulé*, fire having swept the whole district some five or six years ago. The growing timber of the township is therefore of very small size, being chiefly white and black poplar, jackpine, scrubby spruce, tamarack and willow. A large quantity of natural marsh hay occurs on the several sections of this township, notably sections 3 and 4, besides in and about the large muskeg occupying the westerly portion of the township to which we have already referred.

During the past season the water was so deep in this muskeg that comparatively little of the hay was accessible for cutting, but during a fairly dry season a very large amount of hay would be available upon sections 16, 20, 21, 28, 29 and 32. No fresh water streams occur upon this township, but the whole western and southerly portion of the township contains abundance of water in the hay marshes. The northeastern portion of the township is very dry, no water of any description being found. No water-power occurs upon the township. Judging from the growth of vegetation noted in this locality I would say that the climate is quite favourable for the pursuit of general farming. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold, forty degrees below zero being about the lowest temperature recorded during the past winter. The fuel supply of this township is limited to the standing, dead or fallen timber, which, however, in some localities, is very abundant, particularly in the western part of the township. In the northeastern part of the township there are some bluffs of jackpine sufficiently large to be used as firewood but they are quite limited in extent. The formation of this township, like all those of the district, is composed of limestone and upon sections 29, 31 and 32 this outcrops in the form of a solid ridge of rock of about forty feet in height. The surface of this outcropping of limestone was much weathered and shaly, but it is quite possible that if a quarry were opened rock suitable for building material might be found. Other than the limestone above referred to no minerals of economic value are known to occur in this township.

Small game such as prairie-chickens and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

25. This township is situated about fifteen miles west from the shore of lake Winnipeg and about twenty-five miles in a northwesterly direction from Hnausa post-office, from which place it may be reached by means of Fisher river road, which passes in a northwesterly direction through the township. The surface of this township is exceedingly stony and rocky in character, being composed of limestone gravel, or in some cases the bare limestone rock and consequently it is not suited for farming purposes. This township is like others of the district, comparatively level, except at the extreme southeasterly corner where there is a well defined gravel ridge of about thirty feet in height, passing in a northeasterly and southwesterly direction. Much of the township has been swept by fire and is therefore composed of *brulé*, with some standing dead timber and an enormous amount of deadfall, through which in some places it is very difficult to travel. Some bands of green jackpine, however, occur

## SESSIONAL PAPER No. 25b

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 2—Continued.*

in several places. No timber of any commercial value occurs upon this township, the only live timber of any size being some bands of jackpine of from two to four inches in diameter. A considerable amount of natural marsh hay occurs in this township chiefly upon sections 6, 7, 17, 18, 22, 23, 19, 30 and 31. The township being of a stony rocky character possesses less surface water than most others in the vicinity. However, a lake, nearly two miles long occurs in the southwesterly portion of the township, occupying parts of sections 5, 6 and 7, and from the north end of this lake a wet hay marsh extends through sections 18 and 17. Good water may also be found in a large slough on the northwest quarter of section 23. No water-power occurs upon this township. Judging from the growth of vegetation in this locality I would say that the climate is quite favourable for the pursuit of general agriculture. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold. Forty degrees below zero was about the lowest temperature recorded during the past winter. An enormous amount of dry wood occurs in the *brulé* district of this township, some of which is still standing, but a great portion of which is down in the shape of heavy windfall. Some green jackpine woods also occur capable of supplying a very considerable amount of fuel for future use. Although nothing in the shape of a stone quarry has been opened up in this township, the entire surface is underlain by limestone rock, which in many places crops out on the surface. This rock though much weathered and fractured where exposed, might in all probability furnish a serviceable quality of building stone if quarries were opened up. No minerals of economic value are known to occur in this township. Small game such as prairie-chicken and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

*Range 3.*

18. The soil of this township is all of third class quality and about twenty-five per cent of it is hay meadow. There is enough timber remaining for fuel purposes for a few years to come. There are a few settlers in the township who live by ranching on a small scale and fishing in lakes Manitoba and Winnipeg. Very little farming has been done yet by the settlers only to provide garden material for their own necessities.—*C. F. Aylsworth, D.L.S., 1908.*

24. This township is situated only about six miles from the west shore of lake Winnipeg and about twenty miles in a northwesterly direction from Hnauasa postoffice, from which place it is accessible by means of the Fisher river road, which passes through the southwesterly portion of the township. With the exception of the northwesterly portion of this township, which is composed chiefly of sandy clay with clay subsoil, this township is composed almost entirely of swamp land, which in some places is so soft during the open season as to be quite impassable for a pedestrian. This applies more particularly to the southerly central portion of the township. The surface of this township is comparatively level and is chiefly covered by small white and black poplar and swamp spruce, although portions of it consist of very soft open muskegs where little timber of any description is found. Comparatively little valuable timber exists in this township, but heavy poplar woods were met with on sections 1, 2, 6, 12, 27, 28, 33 and 34. This township being composed chiefly of swamp and marsh land contains an abundance of marsh hay, although during the past season the greater

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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 3—Continued.*

portion of it was inundated. No water-power is found in this township. Judging from the growth of vegetation noted in this locality I would say that the climate is quite favourable for the pursuit of general agriculture. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold. Forty degrees below zero was about the lowest temperature recorded during the past winter. The heavy poplar woods already referred to contain a large amount of good firewood. No stone quarries nor minerals of economic value occur in this township. Small game such as prairie-chicken and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

25. This township is situated within a mile of the west shore of Washow bay, lake Winnipeg, and may be approached from Hnaua by means of Fisher river road, which passes within about two miles of the southwest corner of the township; or during the winter season it may be more conveniently approached from Icelandic river by means of a road crossing the muskegs in a northerly direction, and passing within half a mile of the east boundary. The soil of this township in the western portion is of a very stony character, underlain by limestone rock, while in the eastern portion of the township it is chiefly of a swampy nature, apparently of little use anywhere for agricultural purposes. The general character of the surface of this township is extremely flat with slight drainage toward the east. The western portion of the township is composed chiefly of *brulé*, while the eastern part which is of a very swampy nature is covered chiefly with small poplar scrub and swamp spruce. Very little timber of any consequence occurs upon this township, the only block worth mentioning occupying part of sections 23 and 24, where some good spruce, tamarack, birch and balsam were observed. Although this township contains a large percentage of swamp land, very little marsh hay was observed, although in many cases small quantities might be obtained, and it is possible that during dry seasons much of the flooded lands might be productive of a considerable quantity of marsh hay. A large percentage of the surface of this township is of an extremely wet character, particularly toward the east and south. In the southwest quarter of section 10 a small spring creek has its source in a pond surrounded by bubbling springs and flows in a southeasterly direction leaving the township at the southeast corner of section 3. This creek contained fine, clear fresh water and at its source was open throughout the winter season. No water-power occurs upon this township. Judging from the growth of vegetation in this locality I would say that the climate is quite favourable for the pursuit of general agriculture. No summer frosts were experienced, and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold. Forty degrees below zero was about the lowest temperature recorded during the past winter. The fuel supply of this township is not very abundant, being limited to some small bluffs of green timber, the most notable of which occur upon sections 3, 4, 16, 23, and 24. No stone quarries, nor minerals of economic value occur in this township. Small game such as prairie-chicken and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 4.*

25. This township is situated on the south shore of Washow bay, lake Winnipeg, and consequently during the summer season is most easily approached by water. During the winter season it may be reached by means of a good sleigh road from Icelandic river, passing through the muskegs and into the southwest portion of the township. A large percentage of the soil of this township is of a mossy character with clay subsoil. Some good loam with clay subsoil is found about the shore of the bay on sections 17, 18, 19 and 20, but marsh land extends for a greater or less width all along the water front. The general surface of this township is very level with a slight fall toward the north and is chiefly covered with timber, which in some localities is of good size and quality. This township is more than usually well supplied with timber, which is composed chiefly of spruce, tamarack, birch and poplar. Some of the best of this timber would vary from ten to fifteen inches in diameter and appears to be of good quality. The sections upon which the best timber was noted are as follows: 1, 2, 4, 5, 8, 15, 17, 20, 22 and 24. During favourable seasons a large amount of hay land is accessible in this township, though I was informed by a settler on section 20 that during the past season he was unable to cut any hay where he had previously done so for years. Some of the best hay sections are 8, 9, 10, 18, 19, 20, 21 and 29. This township possesses a water front to the north, Washow bay occupying the whole or part of sections 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36. There are also some extensive wet marshes extending through the township from the bay in a southerly direction. No streams of any size pass through the township nor are there any water-powers. Judging from the growth of vegetation noted in this locality, I would say that the climate is quite favourable for the pursuit of general farming. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold, forty degrees below zero being about the lowest temperature recorded during the past winter. This township possesses an abundant fuel supply in the heavy forest which covers a large percentage of its surface. Nothing in the shape of opened stone quarries occur in this township, although on the south boundary of section 2 there is a large outcropping of limestone rock, which if opened up might furnish a serviceable quality of building stone. Other than the limestone referred to, no minerals of economic value are known to occur upon this township. small game such as prairie-chicken and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

*Range 7.*

16. The eastern portion of the area surveyed consists of jackpine, sand and gravel ridges; the western portion consists of tamarack, spruce and a few scattered scrubby muskegs. Portions of these muskegs may be reclaimed for agricultural purposes in the future, as the water seems to flow rapidly towards lake Winnipeg.—*C. F. Aylsworth, D.L.S., 1908.*

*Range 8.*

20. (North outline.) This line being less than half a mile in length, runs through heavy spruce, tamarack, birch and balsam to the east shore of lake Winnipeg. Cordwood was taken out along this line some years ago.—*B. J. Saunders, D.L.S., 1907.*

20. (East outline.) A small bay of lake Winnipeg intersects the east boundary of section 1. Throughout the rest of the township the line runs through level, wet coun-

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 8—Continued.*

try, consisting of tamarack and spruce swamp, with a few small open muskegs. The soil is third and fourth class.—*B. J. Saunders, D.L.S., 1907.*

20. This fractional township lies on the east side of lake Winnipeg. There is a good strip of land about twenty chains wide parallel to the edge of the shore of the lake, of good first class soil composed of the best black loam. It is also well timbered with spruce, tamarack and a good percentage of ash and elm. It is notable that there are a good many spruce of large size, from thirty-six to forty inches, straight and tall. Besides the strip above described, the township is muskeg with a dense growth of black willow scrub and small spruce three or four inches in diameter. The banks of the lake vary from ten to fifteen feet high. The beach is alternately muddy, sandy and stony.—*A. Bourgeault, D.L.S., 1908.*

21. (East outline.) Much of this line falls in lake Winnipeg which it crosses five times. The country is generally wet and level, consisting of spruce and tamarack swamp, while, the shores of the lake being low and marshy, dense willow and alder also occur. This outline crosses the south boundary of the Black River Indian reserve about ten chains south of the northeast corner of section 25, the reserve extending north throughout the rest of the township. Where the line crosses Black river, the stream is about half a mile wide. The soil is third class.—*B. J. Saunders, D.L.S., 1907.*

22. (East outline.) Commencing in a bay of lake Winnipeg the line enters heavy spruce and tamarack swamp on the east boundary of section 12. Throughout the rest of its length the country remains generally wet, there being a few small clumps of poplar on the dry ground. Open muskegs occur on the east boundaries of sections 25 and 36, the northeast corner of the township falling in the latter one, which extends far to the east. The soil is third and fourth class.—*B. J. Saunders, D.L.S., 1907.*

23. (East outline.) The line commences in open muskeg, but the country changes near the middle of the east boundary of section 1 into heavy spruce and tamarack swamp which runs north to section 25, where the country becomes a little higher and spruce, poplar and balsam occur. Sandy river, a sluggish stream about four chains in width, crosses the east boundary of section 25, about twenty chains south of the northeast corner. Heavy spruce, balsam, birch, poplar and tamarack continue to the northeast corner of the township. The soil is fourth class.—*B. J. Saunders, D.L.S., 1907.*

24. (North outline.) The line commences in a spruce and tamarack swamp, but the country changes almost immediately to gently rolling country covered with spruce, birch, tamarack, balsam and pitch-pine. This line intersects the east shore of lake Winnipeg on the northern boundary of section 33, at a point twenty-one chains west of the quarter section corner. Most of the larger timber was taken out several years ago. The soil is third and fourth class.—*B. J. Saunders, D.L.S., 1907.*

24. (East outline.) This line commences in heavy spruce, balsam, birch, poplar and tamarack, but the country changes into heavy spruce and tamarack swamp near the middle of the east boundary of section 1. Several rock outcrops occur, and near the middle of the east boundary of section 13 the country becomes rolling, and poplar, spruce, birch, balsam and pitch-pine occur. Near the middle of the east boundary of section 25 the country changes again to spruce and tamarack swamp, which continues to the northeast corner of the township.—*B. J. Saunders, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 8—Continued.*

25. (East outline.) The line commences in a spruce and tamarack swamp, but the country almost immediately becomes rolling and covered with spruce, balsam, birch, poplar and tamarack. A few ash also occur. The mouth of Manigotagan river crosses the east boundary of section 12, being about half a mile wide. On the north side of the river a strip of fire-killed poplar is found along the bank, but the country soon changes into spruce and tamarack swamp with a few patches of windfall. On the east boundary of section 24 the country becomes rolling and spruce, poplar, balsam, pitch-pine and birch occur, which continue to within twenty chains of the northeast corner of the township, where the country changes again into spruce swamp. The soil is third and fourth class.—*B. J. Saunders, D.L.S., 1908.*

26. (Part east outline.) This line strikes the bank of lake Winnipeg about twenty chains north of the southeast corner of the township, running through poplar, birch and balsam. The bank of the lake is rocky and precipitous.—*B. J. Saunders, D.L.S., 1908*

*Range 9.*

20. A great portion of this township is mostly muskeg, low and wet land. About eighty per cent of its surface is muskeg, covered with a dense growth of black willow scrub and black spruce of small size, good only for fuel. The moss in some places attained a depth of four to five feet, sometimes overgrown with poor hay. There are a few scattered bluffs of spruce and tamarack good for ties and a great many good only for rails. There is a timber belt along the north boundary about half a mile wide of good size spruce and tamarack, suitable for timber. This belt is, or should be, included in the Black River timber berth. There is a timber berth No. 1252 of four square miles. I noticed during the progress of the survey that all the timber good for ties had been cut on this timber berth, amounting to 15,000 and a few hundred logs; this enabled me to take a fair estimate of the rest of this township, amounting to about 35,000 ties and 2,000 logs of spruce and tamarack besides the poplar. This township is not good for farming purposes. The twenty per cent of high and dry land is for the most part stony and very often rock. However, the wet portion may be readily drained into lake Winnipeg.—*A. Bourgeault, D.L.S., 1908.*

20. (North outline.) This line commences in a spruce and tamarack swamp and the country almost immediately becomes rolling and covered with dense poplar and birch which change to heavy spruce, balsam, tamarack and pitch-pine near the northeast corner of section 31. This latter class of country continues generally throughout the township, the hollows consisting of tamarack and spruce swamp. Several rocky ridges of a generally northeast direction occur. The soil varies from third to fourth class.—*B. J. Saunders, D.L.S., 1907.*

24. (North outline.) This line commences in spruce and tamarack swamp, but the country immediately becomes rolling and rocky and covered with heavy spruce, pitch-pine, birch, balsam and tamarack. This class of timber continues east to the corner of the township. The line crosses Manigotagan settlement in sections 31, 32 and 33. Manigotagan river crosses the north boundary of section 35, being about five chains in width. The soil is third and fourth class.—*B. J. Saunders, D.L.S., 1908.*

*Range 11.*

18. This township is generally level country, but numerous rocks which emerged above the surface makes its general aspect broken. Besides the rocks which occupy about twenty per cent of surface a good deal is muskeg or swamp covered with dense



## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 11—Continued.*

black willow scrub and black spruce of small size but generally long and good for rails. The remainder is good soil, ranks first class, is composed of black loam and clay subsoil, and is well timbered with spruce, poplar and scattered tamarack from ten to fifteen inches in diameter. However, in the margin of the rocks there is plenty tamarack of large size suitable for any requirement of the market, especially for piles and ties. There is a little river, a tributary of Maskwa (Bear) river, which crosses the township in a southwesterly direction through sections 24, 14 and 10 and from this last section in a northeasterly and north direction through sections 16, 17, 18 and 20, with an average width of thirty-five links and an average depth of three feet, good for rafting, but numerous dead trees are jammed here and there which render rafting difficult. There is another river about the same size which crosses section 1 in a southwesterly direction, emptying into Winnipeg river. The water in this river is supplied by muskegs and is black (sometimes called Indian water). However it is good to drink. On both sides of these rivers lie splendid belts of white spruce, and here and there in the small valleys are seen elm and ash fit for the settlers' use. With the exception of the southeast quarter of section 6 this township is unfit for farming; nevertheless there are many good pieces of land which rank first class, but are interspersed with muskegs and rocks which render them inaccessible to settlers in summer time. I believe this township should be reserved for a timber limit.—*A. Bourgeault, D.L.S., 1908.*

*Range 12.*

16. The township is mostly wooded with poplar, spruce, birch, balsam and jackpine. The southwestern portion has been burned over and the soil as a whole is not of much value. Along Pinawa channel, when the timber has been taken off, there is land that would make good farms. No hay lands are found. The climate is similar to that at Winnipeg, but there are no high winds and the snowfall is much greater. The tramway being built by the corporation of the city of Winnipeg, from Lac du Bonnet village to Pointe du Bois, crosses Pinawa channel about three miles south of the south boundary of the township, and will, when completed, be an easy means of access to the township. There are no minerals, stone quarries or water-powers in this township. Game consisting of moose, deer, geese and ducks is plentiful.—*Geo. H. Watt, D.L.S., 1907.*

*Range 13.*

10. All the soil in this township is fourth class, about one-third being rocks and the remainder being spruce and tamarack swamps and muskegs with willow and small spruce and tamarack. The soil is therefore practically of no use for agricultural purposes. The whole of the township is covered with bush consisting principally of jackpine, spruce, tamarack and poplar from three to seven inches in diameter and willow, tamarack, spruce and jackpine scrub all equally distributed throughout the township. There is very little hay to be found but there are places if the country was drained which would produce some hay. All the water is fresh and can be had almost at any place without digging, where there are no rocks. There are a few small creeks to be found, all having good water. There are no lakes in this township neither waterfalls nor rapids from which any power could be developed. The climate is the general Manitoba climate, with no indications of summer frosts. Fuel is plentiful and can be had in almost any part of the township, and all through this district, consisting principally of spruce tamarack and jackpine. All the large timber has been cut. There are no stone quarries except rocks and boulders; neither are there coal or lignite veins nor minerals to be found. Moose and some deer are about the only game

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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 13—Continued.*

to be found. The Grand Trunk Pacific railway runs through the southern part of the northern tier of sections. There are no trails except a few wood trails leading to Culver, a station on the Canadian Pacific railway about a mile north of the northeast corner of section 36.—*John Molloy, D.L.S., 1908.*

*Range 14.*

10. All the land, with the exception of three or four quarter sections in the northwest corner of the township is fourth class. About sixty per cent of the surface is high rock varying in height from ten to fifty feet and the remainder is spruce and tamarack swamps and muskegs, with spruce, tamarack and willow scrub. All of the surface is covered with bush, consisting of jackpine, tamarack, spruce and some poplar from three to eight inches in diameter and scrub and willow equally distributed throughout the township. There is very little hay to be had. Water can be had any place off the rocks without digging. There are a few small creeks and four or five lakes, all containing good water. Lake Brereton, a small portion of which is in section 36, is a large lake extending about four or five miles north and about two miles wide from east to west. The other lakes in the township are small, covering about seventy-five or one hundred acres each. Fish can be had in all these lakes, especially in lake Brereton, where they are very plentiful. There are no waterfalls or rapids from which power could be developed. The climate is the general Manitoba climate without any indication of summer frosts. Fuel, consisting of spruce, tamarack and jackpine can be had all through this district. There are no indications of coal or lignite veins. There are no stone quarries, all of the stone being granite or boulders. There are traces of gold to be found in this township, some of which is reported to have assayed three dollars to the ton. One mining claim has already been taken up near the northeast corner of section 28. Moose and black bear are very plentiful here, and wolves in the fall and winter. Geese and ducks are plentiful in the lakes in the spring and fall. The Canadian Pacific railway passes through the centre of the township. Rennie station is situated on section 24, where there is a postoffice and small store. The Grand Trunk Pacific railway passes through sections 36, 35, 34, 33, 28, 29 and 30, crossing the Canadian Pacific near the northeast corner of section 28. There are no trails except a few wood trails used in the winter to draw out cordwood.—*John Molloy, D.L.S., 1908.*

14. The township is reached by canoes from Kenora or Lac du Bonnet on the Winnipeg river. The soil is not generally good. The township is much broken by rough jackpine rocky ridges, some of them burned over and covered with deadfall, and spruce and tamarack muskegs. Some ties were taken out six or eight years ago and though occasional spruce remain they are not valuable. Some of the tamarack in the muskegs is large and suitable for piles. There is also much heavy sound poplar, tall and straight, growing within a mile of the river. Hay is to be found along the banks of Tie creek and is of fair quality. This creek is a large, wide stream, the water of which is good at all seasons of the year. It is used to a considerable extent by tourists who go by canoe down stream from Kenora to Lac du Bonnet, or even farther to Fort Alexander, thence by steamer to Selkirk and then by train to Winnipeg. Sturgeon falls may be used as a power site, and also the narrows in several places might be dammed and the power utilized. Whiteshell river is navigable for boats drawing two feet of water except for a small rapid full of boulders, about one quarter of a mile from its mouth. The rapid is quite submerged at the time of high water in the Winnipeg river. There were no summer frosts and but for the continued downfall of rain in July, August and September, we had fine weather. Rock everywhere is the same



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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 14—Continued.*

pink granite and contains no minerals of economic value. Game consisting of moose, deer, caribou, bear, lynx and the smaller animals are found, and geese and ducks along the streams.—*Geo. H. Watt, D.L.S., 1907.*

15. (South outline.) This line runs mostly over a country composed of rocky ridges separated by muskegs or alder swamp. Near the Winnipeg river there is a strip of heavy poplar and balsam, but elsewhere the timber is mostly unfit for lumbering. The soil is mostly fourth class. There are no water-powers, stone quarries or minerals and no summer frosts were experienced. Game and fish are plentiful and the water is fresh and good.—*Geo. H. Watt, D.L.S., 1907.*

*Range 15.*

2. All the soil in this township would rank as third class, and the greater part of the township is swamp and muskeg with the exception of a few narrow ridges. None of the land would be fit for farming or grazing purposes. The whole of the surface is covered with bush, with the exception of a few quarter sections in the southwest corner, which are open muskeg and very wet. The bush consists principally of spruce and tamarack, varying in size from three to fifteen inches in diameter. There is a little poplar, jackpine and cedar to be found, but only in very narrow strips. There is no hay to be found except in sections 10, 11 and 12, along Reed river, a small stream varying in width from three to twelve feet. All the water is fresh and can be had almost anywhere on the surface. There are no water-powers available. Fuel can be had in unlimited quantities all through this section of country, consisting principally of spruce, tamarack and some poplar, cedar and jackpine. There are no stone quarries, coal or lignite veins or minerals of any kind to be found. Moose and black bear are the only kinds of game to be found. The moose are very plentiful. There are no roads or trails of any kind running through this township except a winter timber road which runs from Sprague and passes through sections 3, 10, 11 and 12. This is impassable except in winter. The town of Sprague is the nearest station; it is situated in township 1, range 14, where there is a store, station, postoffice and a number of settlers. The Canadian Northern railway passes through the southern part of township 1.—*John Molloy, D.L.S., 1907.*

3. The land in this township is all third or fourth class, consisting principally of spruce and tamarack swamps and muskeg. The soil is black loam or clay but is useless for farming or grazing purposes on account of it being so wet and covered with bush. Nearly all of the surface is covered with bush consisting principally of spruce and tamarack, varying in size from three to fifteen inches in diameter. There is a little poplar to be found averaging about five inches in diameter and considerable scrub and underbrush. The timber is equally distributed throughout the township. There are no hay meadows to be found. The water is all fresh, and can be had on the surface in almost any part of the township, at any time of the year. There are no streams of any kind. Fuel is very plentiful, and can be had all through this part of the country, principally spruce and tamarack, and small quantities of poplar, jackpine and cedar. There are no stone quarries, coal or lignite veins. Moose and black bear are the only kinds of game to be found. There are no trails leading into this township, and it is impossible to travel through this district with teams, except in the winter time. Sprague, situated in township 1, range 14, on the Canadian Northern railway, is the nearest village.—*John Molloy, D.L.S., 1907.*

4. Nearly all the soil in this township is fourth class and unfit for farming purposes. The surface is nearly all spruce and tamarack swamps and some large open

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## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 15—Continued.*

muskeg, which are mostly covered with water. The average diameter of the timber which is principally spruce and tamarack with a few poplar ridges would be about five or six inches. It is equally distributed throughout the township except in sections 2, 3, 9, 10, 11, 15 and 16 where there is a large open muskeg. There is no hay to be found in this township. All the water is fresh and can be found in almost any part of the township at any time of the year on the surface or by digging a few feet. The only stream to be found crosses the north boundary of section 31, a creek about twelve feet wide and two feet deep. There are no water-powers, stone quarries, coal or lignite veins to be found in this district. Fuel can be had in unlimited quantities all through this section of country, consisting principally of spruce and tamarack. Moose and black bear are the only kinds of game to be found. There are no trails passing through this township, and it is almost impossible to get into this section of country except in winter time.—*John Molloy, D.L.S., 1907.*

5. The land in this township is all fourth class and unfit for farming or grazing purposes, being made up principally of spruce and tamarack swamps, which generally are under water except in a very dry season. Nearly all of the township is covered with heavy bush, spruce and tamarack, averaging about eight inches in diameter, with some cedar, balsam, jackpine, poplar scrub and underbrush, equally distributed throughout the township. There is no hay in this township. The water is all first class and can be had at any time of the year either on the surface or by digging a few feet. There is a creek crossing the south boundary of section 6, about twelve feet wide and two feet deep. There are no water-powers available. Fuel is very plentiful all through this section of country, principally spruce and tamarack and some poplar and jackpine. There are no stone quarries, coal or lignite veins or minerals of any kind to be had. Moose and black bear are the only kinds of game to be found and are very plentiful. There are no trails or roads of any kind leading into this township.—*John Molloy, D.L.S., 1907.*

6. The land in this township in its present condition is useless, as it is almost completely covered with water from six inches to two feet deep. There is a large muskeg in the north and northeastern part of the township, which is impassable at any time of the year as it is a floating bog and dangerous for man or beast. The soil is all black and a good depth, but very wet and covered with spruce and tamarack swamps. With the exception of the large muskeg spoken of, the whole township is heavily timbered, mostly with spruce, tamarack and some cedar and poplar averaging about seven inches in diameter, and equally distributed throughout the township. All the water is first class and can be had in any part without digging at any time of the year. There are no water-powers to be found. Fuel is very plentiful all through this district, consisting principally of spruce and tamarack. There are no stone quarries, coal or lignite veins. Moose are about the only kind of game to be found and they are very plentiful. The Dawson trail running from Ste. Anne, a town on the Ontario division of the Canadian Northern railway, runs through the northern tier of sections, but it is impassable in this township, as it is mostly covered with water from one to two feet deep and it is altogether impassable across the Cariboo muskeg.—*John Molloy, D.L.S., 1907.*

7. The land in this township is useless for farming or grazing purposes, as it is all bush and covered with water in swamps and muskegs from six inches to two feet deep, except in places where there are large rocks which rise out of the muskeg, and a few ridges. The soil is nearly all a black loam and would be good farming land if there was any possible way of having it drained. Nearly all of the township is

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 15—Continued.*

heavily timbered with spruce, tamarack, cedar and some poplar, birch, balsam and jackpine. The average diameter of the timber is about seven inches, and is equally distributed throughout the township except in the southwest corner which is principally muskeg and floating bog with willow scrub and tamarack about four inches in diameter. All the water is first class and can be had any place in the township at any time of the year. Birch river, a stream averaging about fifteen feet wide and five feet deep passes through the northwest corner. Fuel consisting of spruce, tamarack and poplar, cedar, birch and pine can be had in unlimited quantities through this district. There are no stone quarries, but large boulders and ridges are quite numerous. There are no coal or lignite veins to be found. The climate is the general Manitoba climate. Moose and caribou are about the only kinds of game to be found. They are very plentiful through this district. The Dawson trail leading to Ste. Anne, a town on the Canadian Northern railway, passes through the northern part of the township to the south. There are no trails running through this township and it would be impossible to take a horse into it.—*John Molloy, D.L.S., 1907.*

8. There is scarcely any arable land in this township, as it consists principally of swamps and rocks. All the swamps contain water from six inches to one and one-half feet deep. The soil is nearly all a black loam. All the township is heavily timbered with spruce, tamarack and cedar, and some spots with jackpine, birch and poplar, where there are rocks. All the timber varies in diameter from five inches to two feet, and it is equally distributed throughout the township. All the water is first class and can be had any place in the township at any time of the year without digging. Birch river, a stream about fifty feet wide and from five to seven feet deep runs through the southwest corner. Fuel is very plentiful all through this part of the country, consisting principally of spruce and tamarack. There are no stone quarries, coal or lignite veins or water-powers to be found in this township. The climate is the general Manitoba climate. Moose and caribou are about the only kind of game to be found. They are very plentiful all through this district. There are no trails of any kind leading into this township, and it would be impossible to get a horse within six or eight miles of any part of the township.—*John Molloy, D.L.S., 1907.*

10. The land in this township is useless for farming or grazing purposes as three-quarters of the surface is covered with rock and the remainder is spruce and tamarack swamps. The rocks are from twenty-five to sixty feet high. All the township is covered with bush consisting of jackpine, spruce and tamarack from three to eight inches in diameter and scrub, all equally distributed through the township. There is no hay to be found in this township. Water is very plentiful in the swamps at any time of the year. There are a number of creeks and seven or eight good sized lakes containing good water. There are no falls or rapids from which any power could be developed. The climate is the general Manitoba climate with no indication of summer frosts. Fuel is very plentiful all through this section of country, consisting of spruce, tamarack, jackpine and some poplar, although all the large timber has been cut. There are no indications of coal or lignite veins neither are there stone quarries except granite and boulders. Moose, black bear and wolves are very plentiful. Geese and ducks are plentiful for a time in the spring and fall. The Canadian Pacific railway runs through the centre of the township. Telford station is about a mile east and Rennie about a mile west of the township lines. The Grand Trunk Pacific railway passes along the north boundary. There are no roads except a few winter trails used for drawing wood.—*John Molloy, D.L.S., 1908.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

*Range 15—Continued.*

12. (Part north outline). This line crosses Whiteshell river, a stream about one chain and a half wide, twice within thirty chains. The country here is level and covered with alder and willow. Near the middle of the north boundary of section 35 the country changes, becoming very rough and rocky. The ridges are covered with pitch-pine while the depressions are filled with spruce, poplar, birch, tamarack and balsam, which continue to the northeast corner of the township. The soil is third class.—*B. J. Saunders, D.L.S., 1908.*

*Range 16.*

12. (North outline). This line commences in heavy spruce, balsam, poplar, tamarack and birch, and in the north boundary of section 31 runs for thirty chains in Whiteshell river. This stream comes through One Island lake which lies to the south of the line at this point. It forms the drainage channel of Whiteshell, Little Whiteshell and Cross lake and its tributary waters. Throughout the rest of its length the line runs through a rolling, rocky country covered with pitch-pine, birch, balsam, spruce, poplar and tamarack, while a few ash occur on the north boundary of section 34. Whiteshell river is again crossed on the north boundary of section 34. To the south of the line the river widens out into Little Whiteshell lake. The soil varies from third to fourth class.—*B. J. Saunders, D.L.S., 1908.*

*Range 17.*

12. (North outline). This line runs through a rough rocky country covered with pitch-pine, spruce, birch and poplar. A few stretches of tamarack and spruce swamp occur, usually near the lakes, several of which lie close to the line. A lake lies near the line north of section 31; two lakes, one north the other south of the line, lie along the north boundary of section 32, while a large lake to the north, parallels the line through sections 33, 34, 35, and is intersected by the line in these sections. The line intersects the Ontario-Manitoba boundary thirty-one chains east of the northeast corner of section 35, five chains south of the forty-fifth mile post.—*B. J. Saunders, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1.*

24. This township is situated about thirty miles in a northwesterly direction from Hnausa postoffice on the west shore of lake Winnipeg and may be most easily approached by means of Icelandic river road by way of Framnes and Vidir, the latter place being the nearest postoffice. The character of the soil in the northerly and easterly sections of this township is extremely rocky, in many places the bare limestone rock appearing at the surface and in other places being only covered by a few inches of light gravelly soil. The southwesterly portion of the township is largely composed of muskeg and hay sloughs, which at the time of our survey were flooded with water from the incessant rains. The only good land in the township is situated near the northwest corner, adjoining the east branch of Fisher river, which passes through sections 30, 31 and 32. The northerly and easterly portions of this township are comparatively high and dry. The southerly and westerly portions are somewhat lower with a drainage to the northwest. The east branch of Fisher river, which passes through sections 30, 31 and 32, has an average depth below the general surface of about fifteen feet and thus affords good drainage for the adjoining

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

lands. This township like others in the vicinity has been swept by fire at some time during the past few years and consequently no timber of any value was found. The general character of the surface may be described as 'brulé,' containing a few large, dead, standing stubs and many fallen trees. The growing timber is all very small, from one to three inches in diameter and consists of white and black poplar, scrub spruce, tamarack and willow. A very large amount of natural hay is to be found in the westerly sections of this township, although at the time of my survey it was so inundated as to be inaccessible for cutting. During an average season, however, a very large amount of hay would be available, notably upon sections 9, 10, 15, 16, 21, 17, 18 and 19.

Besides the large amount of water occupying the hay lands in the western portion of this township, the east branch of Fisher river, already referred to, flows in a northerly direction through sections 30, 31 and 32, and is a fine, fresh water stream about fifty feet in width and eight feet deep in places; its average depth, however, is about three feet and the current about two miles an hour. A small fresh water creek also occurs on section 13. No water-power occurs upon this township. Judging from the growth of vegetation in this locality I would say that the climate is quite favourable for the pursuit of general farming. No summer frosts were experienced, and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold, forty degrees below zero being about the lowest temperature recorded during the past winter. The fuel supply of this township is limited to the standing dead or fallen timber, which is not too abundant in any portion of the township. The eastern portion of this township being chiefly composed of limestone rock, much of which appears quite bare on the surface, may afford a serviceable quantity of building stone if opened up. On the surface, however, it appears to be of a very shaly and highly weathered variety. No minerals of economic value occur upon this township. Small game such as prairie-chickens and ruffed grouse were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1907.*

25. This township may be most easily approached by means of a wagon road from Hnausa and Vidir, the distance from Hnausa being about forty miles. It may also be reached by means of a fairly good wagon road from Fisher River mission, the distance from that place being about twenty-five miles. Vidir is the next postoffice. The soil in this township may be graded generally as second and third classes, the better sections occupying the northwest and the northeast corners of the township, where the land is fairly good for farming purposes. In the southwest, sections 6 and 7 are largely occupied by limestone ridges, while the same description applies to sections 2, 3, 4, 10 and 11. Another prominent limestone ridge occupies portions of sections 21, 22, 27, 28 and 34. The surface of this township is somewhat broken by several limestone ridges and the passage of Fisher river through the township from south to north, but otherwise the land may be described as gently rolling. The surface is chiefly covered with poplar and willow scrub and brulé. The township having been swept by fire several years ago. As above intimated, no timber of any consequence is found upon this township, whatever may have existed having been destroyed by a forest fire with the exception of a few trees along the river valley, where they were protected from the fire. No natural hay was found within the area of this township, the nearest local supply being in the next township to the north, from where two settlers living upon sections 26 and 27 obtained their supply. This town-

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

ship is exceptionally well watered by the east branch of Fisher river and several small tributary streams. Fisher river passes through sections 5, 9, 16, 15, 22, 27, 34 and 33, while branches of the same pass through sections 11, 12, 13, 14, 23, 24, 26, 27, 35, and also through sections 20, 29, 30, 31 and 32. The water of these streams is of good quality and well suited for domestic use. Besides these streams no water is found upon the township except on the north boundaries of sections 31 and 32 which are just touched by the west branch of Fisher river. Little or no surface water occurs upon this township. In section 22 a rapid occurs on Fisher river which would afford a limited amount of water-power, the fall of the stream being about ten feet in one hundred yards. The climate of this township is similar to that of the other eastern parts of Manitoba though probably somewhat more moist on account of the proximity of the great lakes both to the east and west. Hard frost sets in about the middle of November sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops, for they were successfully grown during this summer, both in this township and at the Fisher River mission station. An abundant supply of fuel in the shape of dead wood is found in this township, though much of it is now soggy and falling to decay. The new forest growth however is already replacing that which was destroyed by fire and is large enough to give an ample local supply of fuel. No coal or other form of fuel is known to occur in the township. The rock formation being limestone which outcrops at the surface in many places, there is probably any amount of building stone upon this township, though as yet no quarries have been opened up. The most important variety of game known in the vicinity of this township is the moose which is comparatively abundant. Elk or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

26. This township is accessible by means of a wagon road from Hnausa and Vidir, the distance from Hnausa being about forty-five miles. It is also accessible by wagon road from the Fisher River mission station from which place it is distant only about fifteen miles. It may also be reached from the latter place by means of small boats or canoes, following Fisher river, although because of numerous small rapids occurring in this river, the wagon road is the preferable route for heavy freight. The soil of this township may be considered as first and second class, the depth of black loam being in many places eight, twelve and even as much as eighteen inches, having as a rule clay subsoil. The greater part of this township is well suited for general agricultural purposes. The surface of this township is considerably broken by both east and west branches of Fisher river, but otherwise it may be generally described as gently rolling country, much of which is *brulé*, other sections being covered by poplar and willow scrub. Several extensive muskegs occur within this township and occupy portions of sections 1, 4, 5, 10, 11, 12, 13, 14, 15, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35. Rocky limestone ridges of about thirty feet in height occur upon sections 25, 35 and 36 extending in a northerly and southerly general direction. No timber of any value is found upon this township, the original forest having been destroyed by forest fires some years ago. This township is well supplied with a good quality of marsh hay. The chief localities noted are as follows: sections 3, 4, 7, 8, 13, 14, 15, 16, 17, 20, 21, 22, 23; 24; 25; 26; 28, 29, 33, 35 and 36. The western part of this township is well supplied with good water from two branches of Fisher river which pass in a northerly direction through sections 4, 5, 6, 8, 9, 16, 17, 18, 19, 20, 29, 30, 31 and 32. A small tributary of the east branch of this river also passes through sec-



## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

tions 2, 10, 9 and 16. Other small streams occur upon sections 8 and 9 as well as upon sections 18 and 19. Besides these streams a large amount of surface water exists in the muskegs in several sections of the township and more particularly in the north-west corner. Although a number of small rapids occur at various points on both branches of Fisher river, none are of sufficient fall to afford any considerable amount of water-power. The climate of the locality of this township is similar to that of the other eastern parts of Manitoba though probably somewhat more moist because of the proximity of the great lakes both to the east and the west. Hard frost sets in about the middle of November sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops, for these were successfully grown during the past summer both in township 25, range 1 and at Fisher River mission station. An abundant supply of fuel in the shape of dead wood is found upon this township, though much of this is now soggy and falling to decay. The new forest growth, however, is now already replacing that which was destroyed by fire, and is already large enough to give an ample local supply of fuel. No coal or other kind of fuel is known to occur upon this township. The rock formation being limestone, which outcrops at the surface in a few places, there is probably a considerable amount of building stone upon this township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon this township. The most important variety of game known in the vicinity of this township is the moose which is comparatively abundant. Elk or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is rather limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

27. This township is most easily accessible by means of a wagon road from the mission station at Fisher river from which place it is distant only about ten miles. It may also be conveniently reached in small boats or canoes by means of Fisher river which passes completely through the township from southwest to northeast. It may also be reached from Hnaua and Vidor by means of a fairly good wagon road, but is distant from Hnaua about fifty miles. The soil of the central and eastern portions of this township varies from first to second class possessing from six to eighteen inches of black loam upon clay subsoil and is well suited for general agricultural purposes, but the western part of the township as well as the northeasterly corner are exceedingly wet, being composed chiefly of muskeg. The surface of this township varies from level to gently rolling except at the southeast corner, where limestone ridges make their appearance. Nearly half the surface of this township is occupied by muskegs, but the remainder is covered chiefly by poplar scrub and *brulé*. A very limited amount of live timber exists along the valley of Fisher river, but otherwise none occurs upon this township, the original forest having been destroyed by fire some years ago. A large amount of good marsh hay occurs in this township on sections 13, 14, 15, 16, 22, 23, 24, 25, 26, 27, 33 and 34. This township is abundantly supplied with fresh water both from the main stream of Fisher river which passes through sections 18, 17, 20, 21, 22, 27, 34, 35 and also from the extensive muskegs occupying almost the whole of the western part of the township as well as the northeast corner. A number of small rapids occur upon Fisher river in its course through the township, the fall of which was estimated to be from three to five feet so that none of these rapids are sufficient to afford any considerable amount of water-power. The climate of the locality is similar to that of the other eastern parts of Manitoba, though probably somewhat more moist on account of the proximity of the great lakes both to the east and

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

west. Hard frost sets in about the middle of November sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops, for these were successfully grown both in township 25, range 1 and at Fisher River mission station. An abundant supply of fuel in the form of dead wood is found upon this township, though much of it is now soggy and falling to decay. The new forest growth, however, is now replacing that which was destroyed by fire, and is already large enough to give an ample local supply of fuel. No coal or other kind of fuel is known to occur upon this township. The rock formation being limestone, which outcrops in a few places, there is probably a considerable amount of building stone upon this township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon this township. The most important variety of game known in the vicinity is the moose which is comparatively abundant. Elk or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is rather limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

28. This township adjoins Fisher River Indian reserve to the west and may be most easily reached from the mission station at Fisher river by means of a wagon road, but also by means of small boats or canoes on the river which passes through the township. The soil of the eastern half of this township varies from first to second class and is well suited for general agricultural purposes, but the western half of the township is exceedingly wet and largely composed of muskeg. The surface of this township varies from gently rolling to level; the western half of it however is occupied by an immense stretch of muskeg containing wide stretches of open water. The eastern part of the township is chiefly covered by young poplar and willow scrub, but along the banks of the river some large poplar and spruce occur. A small amount of large timber consisting of spruce and poplar from eight to eighteen inches in diameter is found along the banks of Fisher river, more especially upon sections 13, 14, 23 and 24. A large amount of fine marsh hay occurs upon this township chiefly upon sections 1, 2, 10, 11, 14, 15, 16, 21, 22, 23, 24, 25, 26 and 27. The southeastern portion of this township is well watered by the main stream of Fisher river which passes through sections 2, 11, 14, 13 and 24 while a small tributary of Fisher river which passes through sections 16, 22, 23, 21 and 14 supplies the central part of the township with excellent water. The western half of the township contains an abundance of surface water in the extensive muskegs which largely cover it. Although several small rapids occur upon Fisher river in this township, none of them are of sufficient fall to afford any considerable amount of water-power. The climate of the locality of this township is similar to that of the other eastern parts of Manitoba, though probably somewhat more moist on account of the proximity of the great lakes both to the east and the west. Hard frosts sets in about the middle of November, sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops, for these were successfully grown last summer, both in township 25, range 1 and at Fisher River mission station. An abundant supply of fuel in the shape of dead wood is found upon the township, though much of this is now soggy and falling to decay. The new forest growth, however, is replacing that which was destroyed by fire, and is already large enough to give an ample local supply of fuel. No coal or other kind of fuel is known to exist in the township. The rock



## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 1—Continued.*

formation being limestone which outcrops at the surface in several places, there is probably quite an amount of building stone upon the township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon the township. The most important variety of game known in the vicinity of the township is the moose which is comparatively abundant. Elk, or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

*Range 2.*

24. This township is situated in a northeasterly direction and about thirty-six miles distant from Hnausa postoffice, on the shore of lake Winnipeg and may be most easily approached by means of Icelandic river road by way of Framnes and Vidir, which latter is the nearest existing postoffice. The character of the soil in the more easterly portion of this township, particularly along the valley of Fisher river, is that of a black sandy loam with clay subsoil, while farther west the limestone rock again makes its appearance and is in many places but sparingly covered by light sandy clay and gravel. Along the valley of Fisher river, which passes through sections 3, 10, 15, 14, 13, 24 and 25, the soil may be described as first class and well suited for agricultural purposes. The surface of this township is nearly level with slight drainage toward the east and northeast. Through the northwest section runs a limestone ridge and the southwest portion is swampy. No growing timber of any consequence was found upon this township, the whole surface having been burnt over not long since. The country may consequently be generally described by the term *brulé*, in which some tall standing stubs occur and many fallen trees. The growing wood which is chiefly white and black poplar is very small, from one to three inches in diameter. A large quantity of marsh hay occurs upon this township, particularly in some of the northeasterly sections adjoining Fisher river. A considerable amount of hay is also found on sections 2, 3, 10 and 11 as well as on several of the most westerly sections of the township. Besides a large amount of surface water, which is found in the hay marshes throughout the various sections of the township, the southeasterly and easterly part of the township is well watered by Fisher river, a fine fresh water stream of about fifty feet in width and an average of three feet in depth. No water-power is known to occur upon this township.

Judging from the growth of vegetation noted in this locality I would say that the climate is quite favourable for the pursuit of general agriculture. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold; forty degrees below zero being about the lowest temperature recorded during the past winter. The fuel supply of this township is mostly limited to the standing dead or fallen timber, which is none too abundant in the western portion of the township, although the eastern sections are fairly well supplied. No stone quarries have been opened upon this township, but as the formation is that of limestone, although much weathered or broken on the surface, it is quite possible that if opened up to any considerable depth a serviceable quality of building stone might be obtained. Other than the limestone, no minerals of economic value are known to occur in this township. Small game such as prairie-chickens and ruffed grouse were occasionally met with in this locality,

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 2—Continued.*

but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1908.*

25. This township may be reached by a wagon road either from Hnaua and Vidir or from Fisher River mission, the distance from the latter place being about twenty-five miles and that from Hnaua about forty-five. It may also be reached by means of small boats or canoes on Fisher river, but as numerous rapids occur upon this stream the wagon roads are preferable for heavy freight. Vidir is the most convenient post-office, mails reaching there twice a week. In the west and north portions of this township the soil is chiefly first class, averaging eight inches of black loam upon clay subsoil, and is well suited for general farming purposes but in the south and east the soil is more shallow and rocky with only from two to six inches of loam upon limestone rock or gravel. This township is chiefly covered with poplar and willow scrub, but considerable tamarack is found in the marshy lands, and jackpine upon the rocky ridges, of which there are several in the various sections of the township. The surface generally is, however, comparatively level, the ridges ranging from fifteen to fifty feet in height. Little timber of any value is found upon the township, the country having been swept by fire some eighteen or twenty years ago. A few large tamarack occur upon sections 16, 21, 30, and 31, and spruce upon sections 3, 4, 18, 19, 30 and 31, but not in sufficient quantities to be of any commercial value. An abundance of marsh or slough hay occurs in various parts of this township, notably upon sections 9, 12, 13, 14, 15, 16, 21, 22, 25, 28, 29, 33, 34, 35, and 36. This township is well supplied with good fresh water by the west branch of Fisher river and some of its smaller tributary streams. The river passes through sections 7, 17, 18, 20, 29, 28, 33 and 34 and small branch streams pass through sections 7 and 32. A large wet slough occurs upon parts of sections 11, 12, 13 and 14, also affording a local water supply. The average width of Fisher river through this township is about one chain, the depth is about three feet and estimated rate of current two miles per hour. The rock formation of the country being limestone the water of both sloughs and streams is hard but good for drinking purposes. Though some small rapids occur upon Fisher river, none are of sufficient fall to furnish any considerable amount of water-power. The climate of the locality of this township is similar to that of other eastern parts of Manitoba though probably somewhat more moist because of the proximity of the great lakes both to the east and west. Hard frost sets in about the middle of November, sufficient to freeze the swamps and smaller lakes, and snow usually follows within a week or two, though sometimes earlier. The climate is not unsuited for the successful growing of oats, barley, wheat, and all the ordinary root crops, for these were successfully grown during the past summer both upon township 25, range 1 and at Fisher River mission. An abundant fuel supply in the shape of dead wood is found upon this township, although much of this is now soggy and falling to decay. The young new forest growth is however already replacing that which was destroyed by fire and is even now large enough to afford an ample local supply of fuel. No other form of fuel is known to occur in the township. The rock formation being limestone, which outcrops at the surface in many places, there is likely to be any amount of building stone upon this township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon this township. The most important variety of game found on this township is the moose which is comparatively abundant. Elk, or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 2—Continued.*

26. This township may be reached by wagon road either from Hnausa and Vidir, or from Fisher River mission station on the south side of Fisher bay on lake Winnipeg, but it is much nearer the latter place, the distance from Fisher bay being only about twenty miles, whereas the distance to Hnausa is at least twice as great. It may also be reached by means of canoes and small boats following Fisher river, which passes through sections 1, 2, 3, 11 and 12 of this township. On account of the occurrence of numerous rapids upon this river, however, the wagon road is the more preferable route for the transportation of heavy freight. The soil of this township is composed chiefly of black loam on the surface which varies in depth from about four to eight inches and in most cases this is underlain by clay substrata which in some places contains gravel and boulders. In sections 13, 14, 23 and 24 there is a large outcropping of limestone rock, barely covered in many places with a thin coating of soil. The general character of the surface of this township is that of a gently rolling country, but limestone ridges of about twenty feet in height occur upon sections 13, 14, 23 and 24 as well as upon sections 31 and 34. A large percentage of the surface of this township is composed of wet muskegs with open water in some places. Between these muskegs the land is as a rule covered with scrub and brulé. No large live timber now exists in this township, most of it having been cut some years ago, what remained having been destroyed subsequently by forest fires. A very considerable amount of hay occurs in this township, the best localities being sections 14, 23, 24, 27, 28, 33 and 34, a good quality of marsh hay being found on these sections. More or less marsh hay of a coarser quality exists upon many sections about the shores of the muskegs which are very prevalent. This township is well supplied with good fresh water from the west branch of Fisher river and several small tributary streams as well as by the large amount of surface water in the numerous muskegs. Fisher river passes through sections 1, 2, 3, 4, 11 and 12, while sections 5, 6, 24, 25, 26 and 35 are watered by smaller streams. Surface water from the muskegs can be obtained upon almost every section. No water-power exists in this township. The climate of the locality is similar to that of the other eastern parts of Manitoba though probably somewhat more moist because of the proximity of the great lakes both to the east and west. Hard frost sets in about the middle of November, sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable to the successful growing of oats, barley, wheat and all the ordinary root crops, for these were successfully grown during the past summer both in township 25, range 1 and at the Fisher River mission station. An abundant supply of fuel in the shape of dead wood is found upon this township, though much of this is now soggy and falling to decay. The new forest growth, however, is already replacing that which was destroyed by fire and is large enough to give an ample local supply of fuel. No coal or other form of fuel is known to occur in the township. The rock formation is limestone which outcrops in several places; there is probably any amount of building stone upon the township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon this township. The most important variety of game known in the vicinity is the moose which is comparatively abundant. Elk or wapiti are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1903.*

27. This township may be most easily approached from Fisher River mission station either by means of small boats or canoes upon Fisher river or by use of wagons on a road which is bad under the most favourable conditions. The distance to this town-

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 2—Continued.*

ship from Fisher River mission is about fifteen miles. It may also be reached by wagon road from Hnausa and Vidir; this road is fairly good, but the distance to be covered is very much greater, being about fifty-five miles. The soil of this township may be considered as second and third class, the best of it having not more than six inches of black loam upon a clay subsoil, but much of it is only from three to four inches in depth upon gravel or bed rock. More than one-third of the whole area of this township is covered by muskegs, so wet as to render them unfit for use. The general character of the surface of this township may be described as gently rolling with occasional rocky ridges, intercepted by extensive muskegs. With the exception of these the greater part of the surface is covered with poplar scrub. Upon sections 7, 18, 19, 20, 29, 31 and 33 there is a considerable amount of large timber, consisting chiefly of spruce and poplar ranging from four to eighteen inches in diameter. There is also some jackpine ranging from eight to twelve inches in diameter. Although more than one-third of the surface of this township is occupied by muskegs they are as a rule too soft and wet for the production of hay, but a considerable amount of good marsh hay was found upon sections 9, 16, 24, 32, 33 and 35. Although this township is adjacent to Fisher river, only a small branch of that stream passes through any portion of it. This stream flows through sections 14 and 11, discharging the waters of a large muskeg covering the central and southeastern part of the township. Abundance of surface water, however, exists in almost every section of the township and is of a sufficiently good quality for domestic purposes. No water-power exists in this township. The climate of the locality is similar to that of the other eastern parts of Manitoba, though probably somewhat more moist on account of the proximity of the great lakes both to the east and west. Hard frost sets in about the middle of November, sufficient to freeze the swamps and smaller lakes. Snow usually follows within a week or two. The climate seems to be quite favourable for the successful growing of oats, barley, wheat and all the ordinary root crops, for these were successfully grown during the past summer both in township 25, range 1 and at Fisher River mission station. An abundant supply of fuel in the shape of dead wood is found upon this township, though much of it is now soggy and falling to decay. The new forest growth however is now already replacing that which was destroyed by fire and is large enough to give an ample local supply of fuel. No coal or other kind of fuel is known to occur in the township. The rock formation being limestone which outcrops at the surface in several places, there is probably any amount of building stone upon the township, though as yet no quarries have been opened up. No minerals of economic value are known to exist upon the township. The most important variety of game known in the vicinity is the moose, which is comparatively abundant. Elk, or wapiti, are also found and black bears are not uncommon. Timber wolves are reported to exist, though no signs of them were observed. Of feathered game the supply is very limited, being confined to a few ruffed grouse, spruce partridges, prairie-chickens and ducks, the last named being very scarce.—*J. W. Tyrrell, D.L.S., 1908.*

*Range 3.*

24. This township is situated in a northwesterly direction about forty-five miles distant from Hnausa postoffice, on the west shore of lake Winnipeg. It is perhaps most easily approached by means of Icelandic river road, by way of Framnes and Vidir, which latter place is the nearest postoffice. The general character of the soil of this township is that of a sandy clay subsoil and appears to be well suited for general farming purposes. The surface of this township is almost level, with a slight fall toward the northeast, and is comparatively well wooded. This township is

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 3—Continued.*

much better timbered than most others in this vicinity, as the bush fires had evidently been intercepted by Fisher river. Immediately west of the river, and approximately parallel with it there is a very considerable amount of fine spruce timber, many of the trees running from ten to twenty-four inches in diameter. This timber may be said to occur chiefly upon sections 26, 35 and 34, although scattered bluffs of considerable size were also observed upon sections 21, 28 and 29 and more or less in small quantities throughout the other portions of the township. This township contains a fair amount of marsh hay scattered throughout the various sections, the chief localities noted being upon sections 15, 16, 19, 21, 22, 24, 25, 29 and 30 although several small hay sloughs occur in various other sections of the township. In addition to the surface water found in the numerous hay marshes above referred to, the west branch of Fisher river flows in a northeasterly direction through sections 15, 23, 24, 25, 36 and 35, apparently having its source in an extensive marsh in section 15. Fisher river is a fine fresh water stream thirty feet in width, three feet deep and has a current of two miles an hour. No water-power occurs in this township. Judging from the growth of vegetation noted in this locality, I would say that the climate is very favourable for the pursuit of general farming. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold, forty degrees below zero being about the lowest temperature recorded during the past winter. This township is more abundantly supplied with fuel, in the shape of growing timber, than most others in the vicinity, since it has not been so completely swept by fire as most others of the surrounding localities. In addition to the spruce already referred to under the head of timber, a large quantity of poplar and birch is also found growing throughout the various sections of the township, sufficient to provide an abundant supply of fuel for many years to come. No stone quarries have been opened upon the township, but as the formation is that of limestone, although much weathered and broken on the surface, it is quite possible that if opened up to any considerable depth, a serviceable quality of building stone might be obtained. Other than the limestone, no minerals of economic value are known to occur in this township. Small game, such as prairie-chickens and ruffed grouse, were occasionally met with in this locality, but the only species of game found of any consequence is the moose, which is comparatively common throughout the district.—*J. W. Tyrrell, D.L.S., 1908.*

25. This township can be most easily reached by a trail from Teulon, which enters the township in section 1 and ends in section 32. The soil is a black or sandy loam with a clay subsoil, except on the ridges which are usually gravelly or stony. There is some good farming land. The land is gently rolling and covered with heavy timber except in the southeast part which is covered with scrub. The west half of the township is covered with heavy bush. The ridges are covered with jackpine, spruce and poplar which run from about four inches to sixteen or eighteen inches in diameter, while the lower ground is covered with spruce or tamarack of about the same size. The northeast portion of the township is covered with poplar of about four inches to twelve inches, and some scattered spruce and jackpine. The southeast portion of the township is covered with small poplar, jackpine and willow with a few scattered clumps of spruce. Some good hay could be cut around the slough on sections 15 and 16, but most of the sloughs do not produce good hay. There is an abundance of good water in all the sloughs. Fisher river, which crosses the southeast part of the township is a

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 3—Continued.*

rather sluggish stream, about one chain wide, which narrows down to about twenty-five links where there are rapids. It is not a good stream for water-power as at the time of the survey (November) there was very little water in it. There were several places where there is considerable fall and some power could be developed by damming the stream. There is plenty of dry timber everywhere for fuel, but there are no stone quarries nor minerals of economic value. Moose, elk, deer and bear are plentiful. There are a few partridges and prairie-chickens and some foxes and coyotes. Fish are found in Fisher river.—*Chas. M. Teasdale, D.L.S., 1908.*

*Range 4.*

25. This township can be most easily reached by a trail from Teulon which enters township 25, range 3. I opened up a trail easterly across townships 25, ranges 4 and 3, which joins this trail in section 14. The soil consists of about six inches of loam but has a gravelly or stony subsoil in most parts and would be very hard land to clear on account of the timber. The surface is mostly level but is gently rolling in some parts. The whole township is covered with heavy bush consisting of spruce, tamarack, jack-pine and poplar. Most of the timber would run between eight and sixteen inches, but in some parts it is larger, and is best adapted for making railway ties. Some hay could be cut around Little Birch and Sleeve lakes. The sloughs in the remainder of the township do not produce hay but they supply permanent fresh water. There are no streams and so no available water-power. Frosts were quite common after August 15. Dry wood is scarce and there are no coal or lignite veins in the township. There are no stone quarries or minerals of economic value. Moose, elk and bear are plentiful. There are a few partridges. Ducks were plentiful, while good fish are found in both Birch and Sleeve lakes.—*Chas. M. Teasdale, D.L.S., 1908.*

*Range 5.*

24. This township is situated about twelve miles due east of Dog lake, or about twenty miles northeast of Dog Creek Indian reserve. It is doubtless most easily reached from some point on the east shore of lake Manitoba, although it was reached by me by means of a trail cut from the east. The soil of this township is composed chiefly of loam with clay and in some places gravel subsoil. The surface of this township is fairly level and well wooded, but contains a very large percentage of swamp land. In the southern part of the township there is situated a large fresh-water lake which possesses a very swampy, ill-defined shore line. This township contains a considerable amount of growing timber; the most valuable of which is chiefly spruce and tamarack and occupies the northeasterly part of the township, being confined chiefly to sections 24, 25, 36, 35 and 34. The northwesterly part of the township is chiefly brûlé, whilst the central, westerly and southern portions are chiefly composed of swamp lands. This township contains a large percentage of swamp land, but during the past season when the survey was being made, the country was so exceedingly wet that what might, during average seasons, be good hay land, was found to be flooded. In several localities hay was noted, some of them being upon sections 1, 2, 3, 9, 13, 16, 28, 33 and 35. This township is most abundantly supplied with water not only in the numerous marsh lands, but also by means of a large body of water named Stewart lake, occupying portions of sections 2, 3, 9, 10, 11, 15 and 16, and also by a portion of Sleeve lake which occupies the northeasterly part of sections 25 and 36. Both of these lakes are fresh water and it is said that in Sleeve lake abundance of fish of various kinds may be caught. No water-power is known to exist upon this



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township. Judging from the growth of vegetation noted in this locality, I would say that the climate is quite favourable for the pursuit of general agriculture. No summer frosts were experienced and during the past season the weather was extremely wet and productive of great growth. Occasionally the summer temperatures are exceedingly warm, although somewhat tempered by cool breezes either from lake Winnipeg or lake Manitoba. During the winter season the weather is usually fine and cold. Forty degrees below zero was about the lowest temperature recorded during the past winter. In the growing timber this township possesses an abundant supply of fuel for local use. In the *brulé* sections of the township there is also a large amount of standing dead timber as well as fallen wood, which affords an excellent supply for immediate use. No stone quarries nor minerals of economic value occur upon this township. Small game such as prairie-chickens and ruffed grouse were occasionally met with in this locality. Moose are common and several herds of fine elk were sighted.—*J. W. Tyrrell, D.L.S., 1907.*

25. This township may be most easily reached by taking trail or boat from Oak Point settlement or boat from Westbourne to Moosehorn Bay postoffice in township 26, range 8. From there I opened up a trail which runs southeast into township 25, range 8, and then in an easterly direction crossing ranges 8, 7 and 6, entering range 5, in section 18. The trail from there runs easterly and to the north of Little Birch lake leaving the township in section 13. The soil consists of a good black loam with a clay subsoil but is badly broken up by sloughs and lakes and not very desirable for farming purposes. The surface is gently rolling or level. The western half has been mostly burned over and is covered with poplar and willow scrub and some standing dead timber. The easterly half of the township has suffered very little from fire and is mostly covered with heavy bush. There is considerable spruce, tamarack, jackpine and poplar timber from ten to sixteen inches in diameter in the east half of the township. A little hay could be cut around most of the sloughs. There are numerous lakes and ponds which furnish a permanent supply of fresh water. There are no streams but the lakes are joined by wet sloughs in most cases. Frosts were quite common after August 18. There is an abundance of dry wood for fuel, but there are no lignite veins, stone quarries or minerals of economic value in the township. Moose, elk, bear and timber wolves are plentiful. There are a few partridges. Ducks were plentiful, while jackfish are found in most of the lakes.—*Chas. M. Teasdale, D.L.S., 1908.*

#### *Range 6.*

25. Moosehorn Bay postoffice in township 26, range 8, can be reached by trail from Oak Point settlement, or by boat from Oak Point or Westbourne. From there the trail runs in a southeasterly direction crossing the northerly part of township 25, range 8 and enters township 25, range 7, in section 31. From there it runs in a southeasterly direction about three miles and then easterly entering this township in section 18. It crosses the township in an easterly direction leaving it in section 13. The soil averages about six inches of black loam but has mostly a gravelly or stony subsoil and is not well adapted to farming. The surface is level or gently rolling and is covered with poplar and willow scrub and windfall. There is very little timber in the township as only small scattered clumps of spruce have escaped the fires which have destroyed the most of the timber. The timber is not suitable for lumbering but would make good building logs. Good hay is scarce. There is no surface water that is permanent but good water can be got by digging around any of the sloughs. There are no streams and no available water-powers. Hard frost appeared on August 18. Dry spruce and poplar wood is plentiful but there are no lignite veins, stone quarries nor minerals of economic value. Moose, elk, deer, bear and prairie and timber wolves are abundant. There are a few prairie-chicken and partridge.—*Chas. M. Teasdale, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 7.*

25. This township can be reached by a trail from Oak Point settlement or by boat from Oak Point or Westbourne to Moosehorn Bay postoffice in township 26, range 8. From there I opened up a trail running southeast and crossing the northerly part of township 25, range 8, entering this township in section 31. There is considerable good farming land in this township but parts are broken by sloughs. The soil is a black loam with a good clay subsoil in most parts. The land is covered with scrub and a few small scattered clumps of spruce that have escaped the fire when the rest of the township has been burned. There are no large areas of timber and what there is would be suitable for logs for building purposes. There is very little hay as most of the sloughs do not produce grass suitable for hay. There are no permanent bodies of water but good water can be got by digging around any of the sloughs. There are no streams nor available water-power. Hard frost appeared on August 18. There is plenty of dry poplar and spruce for fuel but no lignite veins. There are no stone quarries but limestone comes to the surface in section 14. No minerals of economic value are known. Moose, elk, deer and bear are plentiful. There are some prairie-chickens and partridges and a few prairie and timber wolves.—*Chas. M. Teasdale, D.L.S., 1908.*

26. This township can be reached by taking trail or boat from Oak Point settlement or boat from Westbourne to Moosehorn Bay postoffice in township 26, range 8, from there following a camp trail that crosses the north part of township 25, range 8, and a trail which branches northeast from the main trail in section 30, township 25, range 7. There is considerable good land suitable for farming in this township. The soil is a black loam with a clay subsoil except in the northeast part of the township where the subsoil is more sandy or gravelly. The land is level or gently rolling and is covered with small poplar and willow scrub. There are a few clumps of spruce which have not been touched with fire which would supply good building logs. There is very little hay land. Very little permanent surface water appears, but good water can be got by digging a few feet near any of the sloughs. There are no streams or no available water-powers. Hard frost appeared on August 18 and 19. There is plenty of good dead spruce, poplar and jackpine for fuel, but there are no coal or lignite veins. No stone quarries nor minerals of economic value were found. Moose, elk, deer, bear and wolves are plentiful. There are a few prairie-chicken and partridge.—*Chas. M. Teasdale, D.L.S., 1908.*

*Range 8.*

25. The mail route running from Oak Point settlement to Fairford enters the township in section 30 and leaves it in section 32. This trail is very bad in wet weather. There is a line of boats running from Westbourne which calls at The Narrows, which is on the main trail in township 24, range 9. The soil is a black loam of from four to eight inches with a clay subsoil in most parts. The rock is only about one foot from the surface at the northeast corner of section 11. This township is best suited for mixed farming and stock raising, as it is mostly badly broken up by sloughs. The surface is level and covered with poplar and willow scrub and considerable areas of fair-sized poplar bush. There is some oak on the points running down into Dog lake and some bunches of spruce suitable for building purposes to the east of Moosehorn lakes. On dry years large quantities of hay could be cut to the north of Dog lake and around Moosehorn lakes and marsh. The water is all fresh and springs are quite common through the spruce. Moosehorn creek is very sluggish and in places is entirely lost in the marsh. Large areas of land were flooded to the north of Dog lake during the summer and fall, there being as much as two feet of water at some places where mounds and pits had been built on the base line. There



## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 8—Continued.*

is no available water-power. The climate is very good. The summer is very free from frosts. Dry wood is plentiful as several areas have been burned recently, and the dead trees are still standing. No coal or lignite has been found. There are no known mineral deposits and there are no stone quarries. Moose, elk and deer are plentiful. There are a few chicken and grouse. Duck are plentiful during the summer and fall. Manitoba and Dog lakes are well supplied with whitefish, pickerel and pike. The smaller lakes are stocked chiefly with pike.—*C. M. Teasdale, D.L.S., 1907.*

26. There is a trail running from Oak Point settlement on the Canadian Northern railway to Fairford which enters the township in section 5, crossing on a sandbar at the mouth of Moosehorn creek, and leaves it in section 31. There is also a line of steamers which run from Westbourne on the Canadian Pacific railway calling at The Narrows which is on the main trail. The trail is very bad in wet weather. The soil consists of from four to eight inches of loam with a clay subsoil in most parts. This township is well adapted for mixed farming and stock raising as it is much broken by sloughs. The whole township is level and is mostly covered with from two to four inch poplar and willow scrub but there are some good sized poplars scattered through it. There are some clumps of spruce and poplar in the eastern part of the township which will furnish good building timber. Large quantities of good hay are found around the lakes and sloughs throughout the township. The water is all fresh. There are two very sluggish creeks, the country being very level. The land along the lake front often floods during stormy weather. There is no available water-power. The summers are very free from frosts. Wood is the only fuel as there are no coal or lignite deposits. No stone quarries nor minerals of economic value are known to exist. Moose, elk and deer are found in large numbers. There are a few prairie-chickens and grouse. Ducks are very plentiful during the fall. There are a few timber wolves. Foxes and prairie wolves are quite numerous. Whitefish, pickerel and pike are found in lake Manitoba. The inland lakes are all well stocked with pike.—*C. M. Teasdale, D.L.S., 1907.*

*Range 9.*

25. This township may be reached by a trail running from Oak Point settlement to Fairford which enters the township in section 3, and leaves in section 25, or by taking the steamers from Westbourne to The Narrows, and from there by trail which is very bad in wet weather. The soil is chiefly a shallow loam with gravel or clay subsoil. In the south part of sections 2 and 3 the rock comes close to the surface. It is best adapted to mixed farming. The surface is level and is covered with poplar two to four inches and willow scrub in most parts, as the timber has been destroyed by fire. There is some good-sized poplar on section 3 and spruce and poplar suitable for building purposes in sections 1, 12 and 13. There is considerable hay along lake Manitoba, but little could be cut around the sloughs without draining. The water is all fresh and is plentiful except in very dry seasons. There are no streams. All the hay lands along lake Manitoba is liable to be flooded owing to the rise caused by the wind and storms. There is no available water-power. Settlers report a moderate climate fairly free from summer frosts. Vegetables and corn are grown. Wood is used exclusively for fuel, and no coal or lignite veins are known. There are no stone quarries, and no minerals of economic value are known to exist. Moose, elk and deer are found in the eastern part of the township. There are some prairie-chickens, and grouse and ducks are plentiful. Whitefish, pickerel and pike are abundant in lake Manitoba.—*C. M. Teasdale, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 9—Continued.*

26. There is a trail running from Oak Point settlement to Fairford which enters the township in section 36 and leaves it in section 34. There is a line of steamers running from Westbourne that call at The Narrows, which is on the trail in township 24, range 9. The trail is very bad in wet weather. The soil is a black loam with a clay subsoil. It is best suited for mixed farming as most of the quarter sections are broken by sloughs. The surface is level and to the east of Elm creek is covered with willow, poplar and small birch. To the west of Elm creek it is covered with heavy bush of poplar, birch and scattered spruce of good size. Considerable hay could cut around the marshes which run back from the shores of lake Manitoba. Water would not be plentiful in dry years back from the lake as the sloughs are mostly shallow and there are no streams. The water in lake Manitoba is fresh. The marshes and hay lands along lake Manitoba are liable to be flooded during storms, as the shore is only a few feet above the usual level of the lake. The summers as a rule are free from frosts. Wood is the only fuel as there are no known deposits of coal or lignite. No stone quarries nor minerals of economic value are known to exist. Moose, elk and deer are plentiful. There are a few partridge, prairie-chicken and grouse. Ducks are plentiful along the lakes and marshes in the fall. Whitefish, pickerel and pike are very plentiful in lake Manitoba. Elm creek, which is a very deep bay running back from the lake is a good harbour, being sheltered, and having as great depth of water as lake Manitoba.—*C. M. Teasdale, D.L.S., 1907.*

*Range 10.*

27. There is no trail touching this township. In summer it could be most easily reached by boat from The Narrows or Fairford. The soil is a clay loam with a clay subsoil which should make good farming land. The surface is level and is covered with poplar and willow scrub. Considerable of the township has been burned over within a few years and the only bush of any size is along the lake in sections 35 and 26. Considerable hay could be cut on sections 23, 24 and 13. The country back from the lake is very dry. There are no streams. The marsh and hay land on sections 23, 24 and 13 is liable to be flooded as it is very low. There is no available water-power. The summers are usually free from frosts. There is an abundance of dry poplar all over the township, but there are no known veins of coal or lignite. No stone quarries nor minerals of economic value have been found. Moose, elk and deer are plentiful. There are a few partridge and prairie-chicken. Whitefish, pike and pickerel are plentiful in lake Manitoba.—*C. M. Teasdale, D.L.S., 1907.*

28. This township may be reached by a trail leading from Oak Point settlement to Fairford which enters the township in section 24 and leaves it in section 36. On account of the very level country and numerous sloughs the trail is very bad in wet seasons. There is a line of steamers running from Westbourne to Gypsumville which call at The Narrows in township 24, range 9 and from there the township can be reached by a sailboat. The soil is loam which tends to get lighter towards the eastern portion of the township. It is best adapted to mixed farming and stock raising as there is good grazing throughout the scrubby portions of the township. The surface is level except in section 33 which is slightly rolling and is covered with bush and scrub. Most of the timber except in sections 9, 16, and part of 28 has been destroyed by fire. The timber there is practically all poplar which is of good size but there are a few scattered spruce and oak. Hay is not very plentiful but some might be cut along the west shore north from Elm point in section 9. Besides lake Manitoba the only permanent body of water is a lake on sections 34 and 35 which contains fresh

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 10—Continued.*

water. There are no streams and the land is not liable to be flooded. There is no available water-power. Settlers at Fairford and south along the lake report a very favourable summer and grow all kinds of vegetables but no grain has been grown yet. Dry wood is quite plentiful in all parts of the township. No coal or lignite is known to occur. There is an outcrop of limestone on the shore of lake Manitoba in section 33 at Steep Rock point. Rock also comes to the surface in many places throughout the township. No minerals of economic value are known to exist. Moose, elk and deer are fairly plentiful. There are also a few prairie-chicken and grouse.—*C. M. Teasdale, D.L.S., 1907.*

29. (East outline.) The surface of this township is almost level and is only a few feet above the surface of lake Manitoba. It is chiefly covered with small poplar alternating with willow swamps, muskegs and small hay meadows. The largest muskegs are on the east boundaries of sections 24, 25 and 36. The soil is chiefly black loam from two to eight inches in depth on a subsoil of clay and gravel. At the time of the survey (June) all the willow swamps and hay meadows were full of water. A wagon road leading from Oak Point to Fairford crosses this township. Moose, elk and jumping deer are plentiful in this vicinity. A few partridge and duck were also seen.—*William Christie, D.L.S., 1908.*

30. (East outline.) Fairford river, which is the outlet of lake Manitoba, flowing in a northeasterly direction, crosses the line in section 24. At this place the river is one hundred and twenty yards wide and has an average depth of about eight feet and a fairly rapid current. South of the river the line passes over level land only a few feet above the level of the lake. Several small sloughs and hay meadows, all of which were covered with water at the time of the survey (June) were crossed. A small creek, which flows northwest into lake Manitoba, was crossed in section 12. The dry land is covered chiefly with poplar from two to five inches in diameter and thick willow scrub. On the east boundary of section 13 some brulé and windfall was crossed. Fairford Indian reserve No. 50 is crossed by this outline. It occupies the portion of section 24 south of Fairford river and also a part of section 13. North of the river the surface is also nearly level. The timber here is somewhat larger than on the south side of the river, poplar and spruce up to seven inches in diameter occurring. Small sloughs and willow swamps are also numerous and a tamarack swamp occurs in section 36. The soil is chiefly black loam, from five to eight inches in depth on a clay subsoil, but gravel occurs in a few places. The road from Oak Point to Fairford crosses this township. Moose, elk and jumping deer are said to be plentiful here. A few partridge and duck were also seen.—*Wm. Christie, D.L.S., 1908.*

31. (East outline.) The soil along this outline is inclined to be gravelly and stony, especially on the east boundaries of sections 24 and 13. The surface is very gently undulating, and along the east boundaries of sections 24 and 13 is covered with small jackpine, poplar and birch. The east boundaries of sections 12 and 1 pass through brulé with a thick growth of small poplar and willow. A trail leading from Gypsumville to Pineimuta lake crosses the line in section 24. No sloughs or hay meadows were seen along this line, but hay can be obtained at Pineimuta lake in township 31, range 9. Moose are said to be plentiful here, but beyond a few partridge no game was seen by any of the party during the survey. Duck, however, are plentiful at Pineimuta lake in township 31, range 9.—*Wm. Christie, D.L.S., 1908.*

*Range 11.*

22. This township may be reached by a good trail from Westbourne or Gladstone, stations on the Yorkton branch of the Canadian Pacific railway. There is also a

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 11—Continued.*

trail from Makinak but about half of the distance is through bush and marsh and in some seasons would be almost impassable. This township is level except for a few ridges running generally in a northerly and southerly direction. The soil in the southeasterly part of the township is black loam from six inches to a foot in depth with clay subsoil and stones. In the rest of the township it is generally sandy and stony. The southeasterly part of the township is covered with a thick growth of white poplar from eight to twelve inches in diameter. On sections 20 and 21 there is a small bluff of spruce suitable for building purposes. The rest of the township is covered with poplar, willow scrub and thick underbrush with dead standing poplar in places. On a great many sections there is a lot of fallen poplar, and thick willow and poplar scrub so that it would require considerable work to clear the land. There is some hay along Garrock creek, a stream of good water some fifteen links wide which enters the township on section 3 and runs northeasterly into lake Manitoba. Most of the hay is cut in the sloughs which are scattered throughout the township and the marsh adjoining Ebb-and-Flow lake. Reedy creek a stream of good water ten to fifteen links wide rises in lake No. 1 and flows northeasterly into Ebb-and-Flow lake. Lake No. 1 is situated in the extreme west of the township, contains good water and has a high and dry beach at the northeasterly corner. There is some hay land adjoining lake No. 1 in many places and large marshes on the north and south sides. There are no water-powers, stone quarries or minerals of economic value in the township. The settlers are mostly halfbreeds, descendants of the early settlers who are engaged in cattle raising, fishing and hunting. This last season a number of English and American settlers have taken up land. The township is well adapted for mixed farming and will no doubt be well settled in the near future as the Canadian Northern railway is building a railway to Makinak which will pass close to this township. Game such as moose and elk is plentiful and lake Manitoba abounds with the usual fish of this western country. This part seems to be free from summer frosts; vegetables do well and attain great perfection. Kinosota postoffice is situated on one of the lake lots in front of the township. There is a church and school at Kinosota.

—W. J. Deans, D.L.S., 1908.

23. This township may be reached by a good trail running from Westbourne or Gladstone stations on the northwestern branch of the Canadian Pacific railway. The surface is level and covered with a thick growth of willow and poplar scrub with standing dry poplar and windfall. On sections 3, 4, 5 and 17 there is some white poplar averaging eight inches in diameter. Section 8 is covered with spruce and poplar averaging eight inches in diameter. The soil consists of six inches of black loam with clay, stones and gravel, except that portion lying west of the marsh along Ebb-and-Flow lake which is black loam and sandy subsoil. The cultivated land is confined to a small strip west of the marsh. Ebb-and-Flow lake occupies the easterly part of the township. There is sufficient hay for the requirements of the settlers in the marshes adjoining the lake. Reedy creek, a small stream of good water, enters Ebb-and-Flow lake on lot No. 2. The principal settlers are half breeds who are engaged in cattle raising, fishing and hunting. The settlers depend largely on the fishing industry as a means of making a living. Jackfish, whitefish, tullibee and pickerel abound in the lake of which large quantities are caught and shipped to Westbourne. The want of railway communication is a serious drawback to the settlement of this part of the country. There are no stone quarries, water-powers or minerals of economic value. Game such as moose and elk are moderately plentiful. Small fruit such as raspberries, saskatoon berries and cranberries are plentiful. This part is free from summer frosts and vegetables do well, although the settlers do not appear to do much in gardening, confining their efforts to other pursuits.—W. J. Deans, D.L.S., 1908.

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 11—Continued.*

27. This township can be best reached by boat from The Narrows or from Fairford. The whole township consists of a marsh with a beach about a chain wide on the west side which is covered with elm, maple, poplar and willow. A little hay could be cut along the shore in dry years. There are some small ponds and a small lake along the west side of the marsh. The whole marsh is on practically the same level as lake Manitoba and is liable to be flooded. There are no indications of summer frosts. A little wood is found along the west shore. There are no known coal or lignite veins in the township. No stone quarries nor minerals of economic value have been found. Ducks are very plentiful during the summer and fall. Whitefish, pickerel and pike are found in lake Manitoba.—*C. M. Teasdale, D.L.S., 1907.*

28. This township can only be reached by boat in the summer. There is a good beach and harbour in the northeast of section 14 where boats go in for wood. The soil in the bush is a clay or clay loam, but towards the shore it is a loam with gravelly or stony subsoil. It is best adapted to stock raising. The surface is level. Sections 33 and 34 and the easterly portions of 32, 27, 22, 15, and 10, also the westerly portions of 35, 26, 23, 14 and 11 are covered with poplar bush and willow scrub, considerable of which has been killed by fire. The remainder of the township is principally slough and marsh. Large quantities of hay could be cut as there is considerable land high enough all around the bush to produce the best of hay. The most of the land that is not covered by bush is marshy and does not produce hay. Several lakes and ponds occur through the marsh in the westerly portion of the township. There is very little alkali in any of the water. The whole of the township is very low and at high water and during storms, floods the marshes to the bush. There are no streams and there is no available water-power. Summer frosts are said to be rare. There are no stone quarries or minerals of economic value. Moose are very plentiful in this township, several being seen during the survey. There is an abundance of whitefish, pike and pickerel in lake Manitoba.—*Chas. M. Teasdale, D.L.S., 1907.*

*Range 12.*

27 & 28. Makinak, on the Canadian Northern railway, is the nearest railroad point to this township. Township 27 is very flat and wet. Fully two-thirds of it is hay slough and very wet marsh. The soil consists of a few inches of sandy loam over a hardpan clay with gravel and boulders. If drained it would make excellent grazing land and would be suitable for stock raising. The part lying along lake Manitoba, for an average distance of about one-half mile from the lake, is wet marsh with bunches of willow. Township 28 is very similar, except that there is more woods, a low flat ridge of thick growing small poplar running nearly north through it. This ridge, only a few feet above the rest of the township, is broken by numerous sloughs and marshes. The soil is poor and stony. Township 27 is rather open, about two-thirds of it being hay slough and marsh, the remainder is covered by small poplar, willow and scrub. The country is so flat and low, being only a few feet in any place above the level of lake Manitoba that it would be difficult to drain it. Without drainage, except in dry seasons, the country would be useless for either farming or stock raising. In township 27 there is very little wood of any use. There are some bluffs in the southwest portion, having trees of poplar from three to four inches in diameter suitable for firewood. The most of the timber growth in this township is small poplar, willow and scrub, of no use for any purpose. In township 28 there is more timber growth, all poplar. Some small building logs could be got in this township, but the most of the timber is only fit for firewood. In dry seasons an abundance of hay could be cut in these townships.

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 12—Continued.*

Nearly every section has its hay sloughs, but the most of the hay is to be found in township 27 back from and parallel to lake Manitoba. Without drainage it is only in dry seasons that much hay could be cut. There are no streams in these townships, and no water-powers, but there is an excess of water everywhere. I found the marshes and sloughs everywhere covered with from six inches to three or four feet of water. This water is somewhat hard but of fairly good quality. The climate is similar to that of the rest of Manitoba. There would likely be considerable summer frost. Wood is the only fuel. No stone was seen except boulders, of which there are plenty of all sizes, but they are not suitable for building purposes. No indications of minerals were observed. There are some moose, elk and jumping deer. Very few partridge or prairie-chicken were seen. There are quite a number of muskrat and some mink. A few coyotes or prairie wolves were seen. In seasons there is a large number of wild duck.—*P. T. C. Dumais, D.L.S., 1907.*

*Range 13.*

27. Makinak, a small town on the Canadian Northern railway is the most convenient railroad point. There is very little good land in this township. It consists of a few inches of loam over a subsoil of hardpan clay, gravel or boulders. About one-third of the area is marsh or wet hay slough. If the country was properly drained, stock raising could be carried on in a small way but the country is so low and flat, being in no place more than a few feet above the level of lake Manitoba, that draining would be a difficult and expensive undertaking. As it is at present, it would be impracticable to farm in any way, except in very dry seasons. Some years ago, a Mr. Prime settled in section 29, and for a few years tried stock raising, but on account of the dampness of the country abandoned the attempt and moved elsewhere. There is no true prairie here. There are a few small areas of open country, caused by repeated fires destroying the surface soil and leaving the ground so poor that nothing grows, except some miserable grasses and stunted scrub. About one-third of this township is marsh, open water and wet hay slough, the remainder is covered by poplar of different sizes, mostly small, willow large and small and scrub. If the country was properly drained mixed farming could be carried on or stock raising in a small way. In section 14 there is a bluff of excellent poplar covering an area of seventy or eighty acres. The trees in this bluff run from eight to eighteen inches, and are long and clean in the trunk, making excellent building material. At one time there was considerable large poplar but fires have destroyed this. At present there is plenty of poplar large enough for firewood, with a few green spruce of scrubby kind. There are quite a number of hay sloughs in this township, and in dry seasons a large quantity of excellent hay could be cut. Nearly every section has more or less of hay slough and hay in some places could be cut around the edges of the marshes. If properly drained this township would produce good hay. There is an excess of water, most of it of a fairly good quality. The water in the marshes, muskegs and sloughs is hard, but not so hard as in some other places. I have no doubt that water could be had in any part of this township by digging shallow wells. There are no streams, or water-powers. The climate is similar to that of the rest of Manitoba. Wood is the only fuel and at present there is an abundant supply. No stone except boulders of different sizes was seen; these are to be found in nearly every section, but they are not suitable for building purposes. No indications of minerals were observed. There are some moose, elk and jumping deer. Very few partridge or prairie-chicken were seen and very few rabbits. There are quite a number of muskrat and no doubt some mink. Many coyotes or prairie wolves were seen.—*P. T. C. Dumais, D.L.S., 1907.*



## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 13—Continued.*

28. Makinak, a small town on the Canadian Northern railway, is the most convenient railroad point. With the exception of a portion of sections 6, 7 and 18, the soil in this township is a few inches of loam over a subsoil of hardpan, clay, gravel or boulders. About one-quarter of the area of this township is marsh and slough. If properly drained and roads opened giving access to the railroad, mixed farming in a small way could be carried on. The country is so flat that it would be a difficult and expensive undertaking to drain it. There is no prairie. About one-quarter of the area is marsh and slough, the rest is timbered with poplar, mostly of small size, very little of it large enough for building purposes, with willow and scrub. The most extensive marshes are in the centre and southerly sides of this township. The sloughs are mostly of a marshy character and are pretty well distributed, nearly every section having more or less slough. The timber is nearly all poplar. There are a few scattered spruce of the brushy kind. Fires have run through this country some years ago, killing the poplar. Winds have felled a lot of this fire-killed timber and at present there is a thick second growth of poplar and willow, mixed with this dead timber. Fires have done less damage through the west side of the township and here there is better poplar, but very little of it is large enough for building purposes. A large quantity of wild hay could be cut here in dry seasons. There are a number of hay sloughs, and some hay might be cut around the marshes. Along the valley of Crane river through sections 8, 7 and 18 there are excellent hay meadows. Altogether, I am of the opinion that there is sufficient wild hay for settlers' needs. There is an over supply of water in this township. The water in the marshes, muskegs and sloughs is moderately hard. There is only one stream, Crane river. This flows out of the big marsh, north of Primes lake, in section 5, through the southwest corner of section 8, through sections 7, 18 and a portion of 19. The water in this stream is of excellent quality. It is from forty to fifty links wide and has an average depth of from twelve to twenty inches, with a current of about three miles per hour. There are excellent hay meadows along this stream but they are subject to flooding. In high water the depth of this stream, in the main channel, would be five or six feet, and on account of low banks, the water would spread over the meadows. There are no water-powers. The climate is similar to that of the rest of Manitoba. There are likely summer frosts. Wood is the only fuel and, at present there is an abundant supply of it. Only boulders of different sizes were seen. These are to be found in nearly every section, but they are not suitable for building purposes. No indications of minerals were observed. There are some moose, elk and jumping deer. Very few partridge and prairie-chicken were seen, and very few rabbits. There are quite a number of prairie wolves and some muskrat and mink.—*P. T. C. Dumais, D.L.S., 1907.*

*Range 14.*

27. The most convenient route for reaching this township is from East Bay post-office by way of Makinak on the Canadian Northern railway. A road leads through township 27, range 15, about four miles west of this township. There is a trail through township 27, range 15 which enters this township on the south boundary of section 30 and runs easterly. The soil varies from a dark clay loam to clay and gravel mixed with stones. About one-sixth of this township is waste land, the surface being very flat, there are many marshes and sloughs. This renders it unfit for farming to a great extent unless drained. This township is most valuable for its timber; there is a considerable area covered by poplar three to sixteen inches in diameter and scattered spruce fit for lumber. There are some good hay meadows but at present they are



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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 14—Continued.*

covered with water. It is said that this year was exceptionally wet and more water than usual is on these meadows. There are many salt springs and ponds as well as fresh water marshes and slough. The climate this winter was exceedingly fine. Snow fell to the depth of about two and a half feet in the bush. Of the economic minerals limestone was the only one observed and that only in drift boulders. Game is plentiful, consisting of rabbit, muskrat, prairie-chicken, partridge, duck and geese. Moose, elk and jumping deer are quite numerous, also small wolves and foxes. There are no settlers in this township.—*Adam Fawcett, D.L.S., 1907.*

28. The most convenient route for reaching this township is from East Bay post-office by way of Makinak on the Canadian Northern railway. A trail passes through township 27, about two miles south of the south boundary of township 28, which makes it easy to reach this township in a dry season. The soil varies from a dark clay loam to clay and gravel, mixed with stone. About one-fifth of the township is waste owing to the level nature of the country. There are many marshes and sloughs, which render it unfit for farming, to a great extent, until drained. There is a small stream called Crane river, which enters the township on the east boundary of section 25 and flows northerly across section 36; this stream is about thirty links wide, five feet in depth and contains good water. There is considerable poplar timber in this township suitable for cordwood, and some lumber timber varying from three to twelve inches in diameter. There are some good hay meadows, but at present they are mostly covered with water, it is said that this year has been exceedingly wet and more water than usual is on these meadows. There are many salt springs and ponds as well as fresh water marshes and sloughs. The climate this winter was exceptionally fine; the snow was about thirty inches deep in the bush. Of the economic minerals, limestone was the only one observed and that in drift boulders. Game is plentiful, moose, elk, jumping deer being quite numerous, also small foxes and wolves, rabbits, muskrat, partridge, prairie-chicken, duck and geese. There are no settlers in this township.—*Adam Fawcett, D.L.S., 1907.*

29. The most direct route to this township is by way of Winnipegosis on the Canadian Northern railway. There is a wagon trail from this station to Crane River reserve which passes through this township. The soil in the township varies from clay loam to clay, sand, stone and gravel. About one-fifth of this township is waste land owing to the level nature of the country. There is considerable bush in the township but it is of inferior quality, being small and scrubby, fit only for fence rails and fuel. There are several hay meadows, sloughs and ponds which at the present time (February) are covered with water. There are many salt springs and ponds as well as fresh water marshes and sloughs. The settlers near by state that this season has been exceedingly wet and more water than usual is on these meadows. Crane river, a small stream, flows through section 1 into lake Manitoba. The climate this winter was very fine, bad weather lasting for only one day. Snow fell to a depth of two and a half feet. Limestone was the only mineral of economic value observed, and that was seen in floating drift boulders. Game is very plentiful, consisting of moose, elk, jumping deer, also some black bear, small wolves and foxes. Rabbits, muskrats, mink, prairie-cricken, duck and geese are found in season. There are no settlers in this township.—*Adam Fawcett, D.L.S., 1907.*

30. The most convenient route for reaching this township is by way of Winnipegosis, a station on the Canadian Northern railway, from which place there is a wagon trail to the Crane River reserve. This trail passes a little more than a mile south of the south boundary of the township. The soil varies from a dark loam to clay and gravel and stone. About one-quarter of the township is waste land owing to the level nature

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 14—Continued.*

of the country. There are a good many marshes, ponds and sloughs, which render it unsuitable for farming purposes. There are some salt springs and ponds as well as fresh water marshes and sloughs. The water is alkaline in some ponds. Along the shore of lake Manitoba are some good hay meadows. There is considerable poplar, suitable for cordwood, and some scattered oak, spruce and tamarack. The weather was exceedingly fine, snow fell to the depth of thirty inches in the bush during the winter, and the weather was mild and clear. Of the economic minerals, limestone was the only one observed and that only in drift. Game is plentiful, consisting of moose, elk, jumping deer, small wolves, foxes, rabbits and muskrats. The rabbits are not so numerous as formerly. There are partridge, prairie-chicken, ducks and geese in season. Fish of many varieties are found in lake Manitoba. There is one settler in this township on the northeast quarter of section 12.—*Adam Fawcett, D.L.S., 1907.*

31. The most convenient route to this township is by way of Winnipegosis, on the Canadian Northern railway. There is a wagon trail from Winnipegosis to Crane River reserve. This trail passes through township 29, about seven miles to the south of the south boundary of the township. The land is not of much value, as the timber is mostly poplar and willow scrub, with an occasional spruce tree, and is of inferior quality. The township is too broken for farming, with marshes and sloughs, and is mostly covered by lake Manitoba. The soil is of good quality, dark clay loam to clay and gravel mixed with stone. Game is plentiful, consisting of moose, elk, jumping deer, small wolves, foxes, partridge, mink, muskrat and fish in great variety. No minerals were observed. There are no settlers in this township.—*Adam Fawcett, D.L.S., 1907.*

*Range 15.*

30 & 31. The land on the east boundary of township 30 is gently rolling, covered with scrub poplar, oak and willow, with a few scattered spruce and ash. The land in sections 1 and 2 of township 31 is low lying, covered with scrub, poplar and willow, and is valuable only for fuel. The most convenient route for reaching these townships is by way of Winnipegosis, on the Canadian Northern railway, from which place there is a wagon trail to the Crane River reserve. This trail passes a little over a mile south of the south boundary of township 30. The soil in township 31 varies from a dark loam to clay and gravel, mixed with stone. No minerals were found. Game is plentiful, consisting of moose, elk and jumping deer, small wolves, foxes, rabbits, muskrats, partridge and prairie-chicken, ducks and geese. In lake Manitoba fish of many varieties are found. There are no settlers.—*Adam Fawcett, D.L.S., 1907.*

*Range 16.*

31. (East outline.) This outline passes through second growth poplar from two to five inches in diameter with some willow and old brûlé. The surface is almost level, and the soil consists of black loam from five to eight inches in depth on a subsoil of clay with gravel in a few places. Some small hay meadows occur in sections 12 and 1. No coal, stone quarries or minerals of economic value were noted. Moose and jumping deer are plentiful. A few partridge were also seen and duck are plentiful in lake Winnipegosis.—*Wm. Christie, D.L.S., 1908.*

32. (East outline.) The surface along this outline is nearly level. The soil is mostly good, consisting of black loam from four to eight inches in depth on a clay subsoil. In a few places, however, gravel occurs. A spruce and tamarack swamp about half a mile in width is crossed by the east boundary of sections 25 and 24. The

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 16—Continued.*

remainder of the outline passes through small poplar, willow and jackpine with *brulé*. In section 1 the second growth poplar has attained a diameter of five inches. No stone quarries, coal or minerals of economic value were noted. Moose and jumping deer are plentiful. A few partridge and coyotes were also seen, and ducks are plentiful in lake Winnipegosis, an arm of which extends through this township from south to north.—*Wm. Christie, D.L.S., 1908.*

**36.** (North outline.) This township borders on Waterhen lake to the east. The west shore of the lake crosses the outline in section 36. The surface is nearly level and is mostly swampy. A lake about one-quarter of a mile wide by one mile long is crossed by the north boundary of section 32. A large muskeg extends for a considerable distance north from this lake. Large muskegs and tamarack swamps are also crossed by the north boundaries of sections 34 and 35. In section 31 a strip of green spruce from two inches to eight inches in diameter occurs. The remainder of the outline passes through small poplar, spruce and jackpine, with old *brulé*. The soil is black loam from five to ten inches in depth on a clay subsoil. No coal, stone quarries or minerals of economic value were noted. Moose and jumping deer are said to be plentiful. A few partridge were also seen and ducks are plentiful in Waterhen lake.—*Wm. Christie, D.L.S., 1908.*

*Range 17.*

**33.** (East outline.) This outline passes through almost level country, most of which is low and swampy. The greater part of the east boundary of section 1 lies in a large marsh adjoining lake Winnipegosis. Hay might be cut on part of this marsh when the water is low in the lake. The hay land in this vicinity, however, is liable to be flooded at any time, owing to the fact that a strong north wind often raises the water in the south end of lake Winnipegosis as much as three feet, flooding a large part of the hay land in the immediate vicinity of the lake. On the east boundary of sections 12 and 13 a lake about three-quarters of a mile wide and one mile long was crossed. This lake is surrounded by a strip of muskeg and hay land about half a mile in width. A large muskeg is also crossed by the east boundary of section 36, while small hay meadows are quite numerous all along the outline. The dry land between these marshes is covered with poplar and spruce up to six inches in diameter. The soil is chiefly black loam from five to eight inches in depth on clay subsoil. In a few places, however, gravel occurs. No coal, stone quarries, or minerals of economic value were noted. Moose and jumping deer are plentiful. A few coyotes, rabbits and partridge also occur, and ducks are very plentiful.—*Wm. Christie, D.L.S., 1908.*

**34.** (East outline.) The soil along the line consists of black loam, from five to eight inches in depth, on a clay subsoil. The surface is almost level. Numerous small hay meadows are crossed by the east boundaries of sections 12, 13 and the south half of 25. A muskeg about a mile long by half a mile wide is crossed by the east boundary of sections 25 and 36. The rest of the outline passes through poplar, spruce and tamarack up to six inches in diameter, with old *brulé* in places. No coal, lignite, stone quarries or minerals of economic value were noted. Moose and jumping deer are plentiful. A few coyotes, rabbits and partridge were also seen.—*Wm. Christie, D.L.S., 1908.*

**35.** (East outline.) The country passed over by this outline is nearly level and is chiefly covered with poplar, spruce and tamarack up to six inches in diameter, with old *brulé*. In section 12 spruce and poplar up to fourteen inches in diameter is found. A lake about half a mile wide by one and one-half miles long is crossed by

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 17—Continued.*

the east boundary of section 13. The greater part of this lake lies in township 35, range 16. A large muskeg surrounds this lake. The soil is black loam, from five to ten inches in depth, on a clay subsoil. Very little hay land was seen along this line. No minerals of economic value or no stone quarries were noted. Moose and jumping deer are found. A few partridge were also seen.—*Wm. Christie, D.L.S., 1908.*

36. (East and north outlines.) The surface of this township so far as could be seen from these outlines is nearly level and contains several large muskegs. A large muskeg occupies the greater part of section 1, another is crossed by the east boundary of section 13 and still another by the east boundary of section 36, while a fourth is crossed by the north boundary of section 34. The rest of the township is chiefly covered with small poplar, spruce, jackpine and tamarack, with old brulé. A strip of spruce, some of which has attained a diameter of ten inches, occurs in section 34, east of the muskeg mentioned above. The soil is chiefly black loam, from five to ten inches in depth, on a clay subsoil. An excellent harbour almost one-half mile wide by one mile long, known as McAuley's harbour, lies in section 33. The entrance to this harbour from lake Winnipegosis is in section 4, township 37, range 17, Point Brabant, on the east shore of lake Winnipegosis, in this township, consists of a cliff of limestone about twenty feet high. It is possible that stone might be quarried here. No coal or minerals were noted. Moose and jumping deer are said to be plentiful. A few partridge and duck were the only game seen during the course of the survey.—*Wm. Christie, D.L.S., 1908.*

*Range 18.*

28. Fractional sections 25 and 36 are situated at the northeast corner of Dauphin lake. The surface is level and covered with willow and poplar scrub. The soil is black loam ten inches deep, with sand, stone and clay. The land is marshy along the shore of the lake. The water in the lake is good. Summer frosts are unheard of.—*W. J. Deans, D.L.S., 1908.*

*Range 20.*

23. Sections 35 and 36 of this township are north of the Riding Mountain forest reserve. On the east half of section 35 and the west half of section 36 there is a heavy poplar bush. The remainder of these sections is covered with scrub. A small stream crosses the east boundary of section 35 and flows westerly into Vermilion river. This river crosses the north boundary of section 26, flowing northerly. The soil is black loam, eight or ten inches deep, with clay and gravel. Building material is plentiful and there is an abundance of wood for fuel. The water in the streams is good. Hay is very scarce.—*W. J. Deans, D.L.S., 1908.*

35. There is a fair wagon road from Winnipegosis to Pine creek and Duck bay which runs northerly about one mile east of the easterly boundary of this township; and from which a few rough wagon trails and hay roads enter this township on the east side. There is also a rough wagon trail cut through from the Indian reserve to Cowan, a station on the Prince Albert branch of the Canadian Northern railway, but this latter must be quite impassable during the summer on account of water. The soil consists of from four to ten inches of black loam overlying sand or gravel and must be regarded as ranging between second and third class and as being more suitable for cattle raising than for grain growing. The surface is level throughout and covered with brulé and second growth poplar for the most part, except in sections 1, 2, 3, 11 and 12, where there are some big alkaline hay marshes. All along the west boundary of the township the surface consists of jackpine gravel ridges alternating with long

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 20—Continued.*

stretches of what looks like muskeg but cannot properly be so described, being a covering of moss from six to eighteen inches thick, overlying gravel, boulders and limestone shale. There is no marketable timber in this township, almost all the original timber having been destroyed by fire. What there is consists of second growth poplar chiefly, grown up since the date of the last big fire, apparently about sixteen or seventeen years ago. What timber remains consists of poplar from six to ten inches, with some spruce along the river banks. There are numerous hay sloughs throughout this township, on some of which the Indians put up large quantities of hay every year. This hay is distinctly what is called 'slough' hay, there being very little of what may be called hay meadow, i. e., lands which grow red-top, blue-joint or other upland hay. The township is abundantly watered by three large streams, South Duck river, a branch of the same to the west of it, and Pine creek, all of which are permanent and are somewhat alkaline. South Duck river is about eighty feet wide, with banks from eight to fourteen feet high, and varies in depth from one to seven feet at ordinary water with a current that varies correspondingly from one and one-half miles per hour to an imperceptible rate. The other two creeks are from forty-five to sixty feet wide and in depth, height of banks and current are similar to South Duck river. On all these creeks it is noticeable that in spring the water must at times overflow their banks, but these occasions are comparatively rare. There are no available waterfalls or powers in this township and I saw no sign of minerals or quarrying stone. There is abundant wood fuel to last settlers for many years to come. Moose, deer and bear are found in this township and there are beaver colonies in active operation this fall on all three of the above mentioned creeks, a fact which reflects a great deal of credit on the local traders, hunters and Indians, when it is considered that one of these colonies on South Duck river is within four miles of the trading post at Pine Creek.—*R. W. Cautley, D.L.S., 1908.*

*Range 21.*

23. Sections 12 and 13 of this township are heavily timbered with poplar, ten inches in diameter. The soil is black loam, eight inches deep, with clay subsoil. The surface is gently rolling. A small stream running easterly crosses the east boundary of section 11 and the north boundary of section 12. There is a large hay meadow on section 13. The water is good and building material and fuel are plentiful.—*W. J. Deans, D.L.S., 1908.*

31. Sections 1, 2, 3, 4, 5 and 6 are low and wet, covered with willow and poplar scrub, with many large hay marshes in which large quantities of hay might be cut, but which are now neglected, the settlers having abandoned their homesteads on account of the country being flooded in wet seasons. The great need of this locality is drainage. If properly drained this would be a great cattle country and would soon be well settled. The water in the marshes is fresh and good. There is some building timber on sections 1 and 6 and abundant standing dry trees for fuel.—*W. J. Deans, D.L.S., 1908.*

*Range 23.*

29. Sections 1, 12, 13, 24, 25 and 36 are east of the Duck Mountain forest reserve. The surface is gently rolling, covered with a thick growth of poplar, and poplar and willow scrub. Section 1 is heavily covered with spruce, averaging ten inches in diameter. The soil is clay with stones and gravel. The water both in sloughs and streams is good. Hay is very scarce and hard to get. Building timber is plentiful and there is wood for fuel in abundance. These sections are nearly all taken up and on some of the sections the settlers have made substantial improvements.—*W. J. Deans, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 23—Continued.*

30. Sections 1, 12, 13, 24, 25 and 36 are east of the Duck Mountain forest reserve. The sections are rolling and broken up by valleys of streams on sections 1, 12, 24, 25 and 36. All of these sections are covered with thick poplar and willow scrub. On section 13 there is some spruce, averaging ten inches in diameter. There is sufficient timber for the requirements of the settlers and abundance of fallen timber for fuel. The soil is clay with sand and gravel. The water in the streams is good. Hay is very scarce. Most of the sections are settled on and the occupants have made great strides for the short time they have been on the land.—*W. J. Deans, D.L.S., 1908.*

*Range 24.*

26. Sections 21, 28 and 33 are situated east of the Duck Mountain forest reserve. The surface is heavily rolling and covered with poplar and willow scrub. The soil is black loam, eight to ten inches deep with clay, sand and stones. There were no settlers on these sections at the time of survey. The water in the sloughs and streams is good. There is some good poplar suitable for building purposes on section 28.—*W. J. Deans, D.L.S. 1908.*

*Range 26.*

23. Section 6 is rolling prairie, scrubby in the south part, with a few hay marshes. The soil is black loam, twelve inches deep, with clay subsoil. The settlers are engaged in mixed farming. Fuel can be obtained nearby on the Riding mountains where there is any amount of fallen timber suitable for that purpose. The water is good in the sloughs and wells.—*W. J. Deans, D.L.S., 1908.*

*Range 30.*

24. This township may be easily reached by a good trail running from Langenburg station on the Northwestern branch of the Canadian Pacific railway. The surface is rolling and mostly open prairie with a few bluffs of small poplar, the soil is black loam, from eight to twelve inches deep, with clay subsoil. The township is well adapted for mixed farming as there are many small hay marshes and sloughs in which there is an abundance of water and around which large quantities of hay can be cut. There is no available land in this township for homesteading, but a large area of the best land is in the hands of speculators who are no doubt holding it expecting a big price as soon as the Canadian Northern railway, in course of construction, reaches this part. The township is settled with Galicians and people from the eastern provinces. Good water is hard to obtain, the well water being highly impregnated with mineral; the slough water is mostly alkaline, but cattle like it. The settlers are all engaged in mixed farming and appear to be prospering. This section of country has been unfortunate in regard to summer frosts; for two seasons the grain has been frozen as well as the vegetables, but no doubt the frosts will disappear when cultivation becomes more general. There is no timber in the township and the settlers have to go long distances to obtain sufficient for building purposes and fuel. There are no water-powers, stone quarries or minerals of economic value in the township. Wild duck are plentiful in season, and there are a few prairie-chicken, but the latter are becoming very scarce.—*W. J. Deans, D.L.S., 1908.*

*Range 31.*

29. Sections 33, 28 and 21, outside of Coté Indian reserve No. 64, are covered with small poplar and willow scrub, with small openings of clear prairie. The surface is



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## TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

*Range 31—Continued.*

rolling and the soil is black loam with clay subsoil. Sections 20 and 19 are rolling and covered with small poplar and willow scrub. The soil is black loam inclined to be sandy. The Indian school is situated on section 19, a large part of which is under cultivation.—*W. J. Deans, D.L.S., 1907.*

30. The westerly half of this township lies in the Coté Indian reserve No. 64, and may be easily reached by numerous trails from the village of Kamsack, a divisional point on the Canadian Northern railway. The soil generally is a rich black loam and well adapted for the production of wheat and oats. The surface is rolling and covered with small poplar, and poplar and willow scrub, with numerous small clearings. The poplar did not exceed four inches in diameter and would not be large enough for building purposes, but would do for fencing and fuel. There is enough hay throughout the township to supply the ordinary requirements of the settlers. There are numerous small creeks of good fresh water and a large number of the sloughs contain potable water. There are no water-powers, stone quarries or minerals of economic value in the township. The easterly portion of this township being on Duck mountains is much rougher and more broken than the westerly half. Game, such as wild duck and prairie-chicken is numerous. Elk and moose were seen but were very wild. There are a few settlers in the easterly part of the township who are engaged in mixed farming and appear to be doing well.—*W. J. Deans, D.L.S., 1907.*

31. Along the easterly boundaries of sections 15 and 22 the country is open prairie with scattered scrub, except at the northeast corner of section 22 where it is flat and wet in places. The north boundaries of sections 19, 20, 21 and 22 pass through a rolling country covered with a thick growth of poplar from four to six inches in diameter. Near the northeast corner of section 13 a stream of good water, twenty links wide, crosses the easterly boundary and flows westerly. The soil throughout is black loam, clay and sandy subsoil and is well adapted for agricultural purposes. Kamsack is the nearest railway station to this township.—*W. J. Deans, D.L.S., 1907.*

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 1.*

21. The surface of the township is rolling and the soil a rich black loam with clay subsoil. The township is covered with a growth of small poplar and willow scrub, except the southerly part which is open prairie with clumps of willow and poplar scrub. No trees large enough for building purposes were seen but there is an abundance of fuel for many years. Cutarm creek, a stream of good water, about twenty feet wide, enters the township on section 35 and flowing southerly leaves it on section 24. The valley of this stream varies in width from one-quarter to one-half mile with banks about eighty feet high. There are many fine hay meadows in the valley of Cutarm creek, but the settlers complain that the beaver, which are multiplying very fast, destroy the hay land by damming the creek and flooding the land. This township was settled many years ago as it was expected that the main line of the Canadian Pacific railway would pass through it. Few of the old settlers remain, having become discouraged through want of railway facilities. There are no minerals to be seen, although springs along Cutarm creek seem to be highly impregnated with iron. There are no stone quarries nor water-powers. The settlers are engaged in grain growing and dairying and appear to be successful and prosperous. Esterhazy on the Pheasant Hills branch of the Canadian Pacific railway is the nearest station to the south part of the township, and Bredenbury is the nearest station for settlers residing in the north part. There are good roads leading to the various villages on the railways.—*W. J. Deans, D.L.S., 1907.*



## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 1—Continued.*

38. The soil of this township is a black loam with a subsoil of clay or sand and if not for the early frost would be good for farming, especially the growing of fall wheat. The timber is mostly poplar and spruce, varying from eight to twenty-four inches in diameter, chiefly in the northwestern sections and scrubby to the east side. There are numerous small sloughs of hay of a good quality and good for cattle, but the horses do not thrive on it. One large slough just north of the four-mile chord extends well across the township. Plenty of fresh water is found in small creeks and can be had easily by digging, especially in the swampy districts. There are no creeks or rivers that would do for water-power. The climate is variable from hot day to cold nights, and we had frosts that froze water in July, and also frequent rains. Plenty of fuel, consisting of spruce and poplar is found. There are no stone quarries or minerals and little stone except near a creek and then only boulders. There seemed to be plenty of jumping deer, moose, bear, partridge and duck, and sometimes traces of wolves and mink were found.—*Edgar Bray, D.L.S., 1908.*

*Range 2.*

38. After leaving Fort Pelly, Saskatchewan, we travelled in a northwesterly direction and followed the valley of Swan river up to Bear creek where we camped. As no road or trail was yet cut we had to do this ourselves. The soil in this township is a black loam with a sandy or clay subsoil and once in a while gravel or clay. If there were no early frosts it would be suitable for mixed farming. The township as a whole is rolling and timbered more heavily in the eastern side next Swan river with spruce and poplar ranging from eight to thirty inches in diameter, with underbrush. On the western side is more of a muskeg nature, and the timber is in bluffs and of a scrubby nature. There are plenty of small fresh water streams, but many get very low in the summer season and very high during spring and fall. In the southwest corner near Goose lake there are many hay sloughs with abundance of hay which would be suitable for ranching. No water-powers are available as the streams are too sluggish and unreliable. Warm days, cool nights, early and late frosts predominate, but this will likely change as the country is settled. Wood fuel abounds, but no coal, minerals or stone quarries were found. Plenty of game, such as moose, jumping deer, bear, mink, wolves, coyotes, duck and geese were noticed.—*Edgar Bray, D.L.S., 1908.*

*Range 3.*

38. This township was reached from township 38, range 2, along the Nut lake Indian trail which had to be cut so as to get the wagons through. We were unable to get any farther north than the two-mile chord, owing to the swampy nature of the country. The township is wooded in the south with poplar, spruce from six to eighteen inches in diameter, and scrub, and is rolling, but in the northern part it is more level and the timber nearly all spruce of the same dimensions. Numerous hay sloughs are scattered throughout the township and also small streams and ponds. It would make good ranching land. There are no water-powers as the streams are too small and nearly dry up during the summer season. Summer frosts prevail. Only wood fuel was found. No stone quarries or mineral veins were noticed. Game, such as moose, jumping deer, bear, wolves, coyotes, duck, geese and mink are plentiful.—*Edgar Bray, D.L.S., 1908.*

*Range 5.*

37. The route to this township begins at Canora on the Canadian Northern railway and runs in a northwesterly direction, passing by Astwood postoffice along a good

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 5—Continued.*

trail to Fulton's mill in township 38, range 5, through the centre of this township. The soil is very good though in places very stony and is suitable for farming. The easterly half of section 4, the southwesterly quarter of section 5, the east half of the westerly quarters of section 9, a small fraction of the easterly half of sections 21 and 28 and the westerly half of section 33 are prairie lands. Section 6 is timbered with white poplar, four to ten inches in diameter, and the remainder of the township is scrubby. The only timber is on section 6 and varies in diameter from four to ten inches, suitable only for building logs or fuel. There is a good supply of upland hay on the prairie and considerable slough hay in the Etoimami river valley, and good hay sloughs are spread over the township. There is a sufficient and permanent supply of good fresh water. The only stream of any size in the South Etoimami river which rises in South Etoimami lake in sections 33 and 34, township 37. It has an average width of thirty feet, depth of three feet and a strong current and flows the year round. There are no waterfalls in this township. The climate is colder than most of the older sections of southern Saskatchewan but should moderate as the land is cleared. Summer frosts were numerous and occurred in every month of the past summer. Wood is the only available fuel and white poplar fit for fuel is spread over the township, except on the prairie. There are no stone quarries or minerals of any kind in this township. Jumping deer, moose, duck and partridge are the only game and were very scarce during last season.—*C. A. Chilver, D.L.S., 1907.*

*Range 9.*

32. This township is easily reached by a good trail running southerly from Invermay, a station on the Canadian Northern railway. The soil in this township is a black loam with a clay subsoil and is suitable for grain growing and mixed farming. The surface is rolling and covered with scrub and poplar. The poplar which averages about six inches in diameter is principally around a large salt lake which occupies the northern part of the township. Large quantities of wood are cut in the township and shipped west for fuel. There are large quantities of hay around the lakes and sloughs in the township. The water in the lakes and sloughs is salty but horses and cattle seem to thrive on it. There is a small stream enters the salt lake near the northeast corner of section 34 and runs out of the lake near the southeast corner. There are no water-powers, stone quarries or minerals of any kind in the township. The climate is good and free from summer frosts. Game such as wild duck, is plentiful and occasionally jumping deer and moose are seen. There is a good market for farm produce at Invermay which is close to the township.—*W. J. Deans, D.L.S., 1907.*

42. There is no good road into this township, though there is an Indian pack trail from the vicinity of Nut lake running through it. We cut a trail from Mistatim which would only be of service in winter as it crossed many sloughs and marshes. The surface of the township varies from nearly level to almost hilly and is nearly everywhere covered by a heavy second growth of poplar, the older forests having apparently been burned. The soil is rich and strong and should be well suited for all kinds of farming. No timber of value was seen though the larger poplar and a few scattered spruce and tamarack might supply the needs of settlers for a time. Hay appeared to be abundant on the uplands and in many small sloughs and larger marshes throughout the township. Water is plentiful. One of the drawbacks to this part of the country is the excess of water, but this township though having many sloughs had also plenty of fine high land. No water-powers, economic minerals or game were seen. Copeau river flows across the township in a narrow and not very

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 9—Continued.*

deep gully, well lined with willows. This gully is probably flooded in the spring, though at the time of the survey (February) the river was quite small. The water in it is excellent and though no water-powers were seen the current is very good. This township should prove good for settlement when made accessible by fair roads.—*Geo. A. Grover, D.L.S., 1907.*

43. This township was reached by a trail from Mistatim which we cut, but it could be used only in winter as it crossed many sloughs and ponds. I was informed by some lumbermen that there is also a lumber trail from Bannock to the north side of this township. The surface is very nearly level and the soil is generally a black loam on clay that should raise excellent crops. In the centre of the township there are several large marshes or muskegs, apparently not very deep, as they were generally covered with vegetation and frequently we were unable to get water in such places after digging through the frost. The township has evidently been burned over in the past and is now chiefly covered with second-growth poplar of two to three inches in diameter. There is, however, a certain amount of large timber consisting of spruce, tamarack and poplar scattered over the township and to the north of Red Deer river there is considerable spruce of some size which I understand is already claimed by the lumber companies. There is plenty of wood for both fuel and building for settlers for many years. Numerous small hay sloughs and the larger marshes should make hay and water abundant, and there is also good forage for cattle among the trees. Red Deer and Copeau rivers both cross parts of this township; the former, a considerable stream sixty to eighty feet wide, was frozen over at the time of survey (February) but I judge it would be about three feet deep and have a current of two or three miles per hour. The Copeau is only a good sized creek, but at flood time might be quite formidable. There were no economic minerals, game or water-powers seen. The township should be good for settlement when means of communication are established, though there are at present no settlers in that vicinity.—*Geo. A. Grover, D.L.S., 1907.*

*Range 10.*

41. (East outline). This township though broken by hills in the southwesterly part and heavily wooded should prove a good one for settlement when the timber has been taken off, as the soil is obviously strong and fertile and it is well drained by numerous creeks.—*Geo. A. Grover, D.L.S., 1907.*

42. There is no wagon trail into this township, but there is a good wagon trail to the northwest corner of township 42, range 11, from Crooked River station, on the Canadian Northern railway, from which it would be comparatively easy to get into this township, either with pack horses or even with a wagon. The soil is somewhat light, consisting of a sandy loam, but supports a good natural growth in most places and is suitable for grain growing or mixed farming, since much of it could be easily cleared. The surface is undulating or easily rolling except in sections 15, 16, 17 and 21, where it is somewhat broken, and covered for the most part with poplar and willow scrub, with occasional bluffs of poplar or spruce timber. There are numerous small prairies, and some sloughs, on which hay of good quality could be cut, but there are no important hay meadows. There are scattered bluffs of spruce and tamarack throughout the township which though unimportant in extent from a lumberman's point of view, will be of great value to incoming settlers. Red Deer river furnishes an excellent and permanent supply of fresh water in this township. It flows through the township in a northeasterly direction from section 18 to section 33. There is a tributary creek which enters the township in section 6 and flows into Red Deer river in section

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 10—Continued.*

28. Red Deer river has an average width of seventy feet, is from two to six feet deep, has a current of about two miles per hour and flows through a marshy valley about a quarter of a mile wide with banks from twenty to seventy feet high. The tributary creek referred to above is ten feet wide, has a gravel bottom, is two feet deep and flows about two miles per hour. It is probably spring-fed, since it remained open in most places all winter. The only part of this township liable to be flooded is the bottom land of the Red Deer. There are no water-powers in this township and no indications of coal, stone or minerals. Moose, deer, bear and lynx are found throughout this district, and there are fish in Red Deer river. There is a good average rainfall throughout this section of the country and the danger from summer frosts is, as elsewhere in the province, constantly decreasing. There are no settlers in this township.—*R. W. Cautley, D.L.S., 1907.*

43. This township is at present accessible only in winter by trails cut by lumbermen to the north and those which I have cut into the centre of the township. It is not, however, far from the Canadian Northern railway and with the advent of settler's trails can doubtless be easily made. The township is most suitable for settlement, the soil being strong and rich and the surface almost generally level with just enough slope to ensure drainage. There is, however, a pretty heavy growth of young poplar throughout the township. In sections 28, 29, 30, 31, 32 and 33 there is a very good timber limit, spruce three to four feet in diameter being seen. Throughout the township there is an abundance of wood for fuel and building, and the water supply is permanent and plentiful. Red Deer river pursues a tortuous course through the southeast corner of the township. It is about fifty to seventy-five feet in width, two feet deep, and runs about three miles an hour. There were no settlers at the time of survey. No game, economic minerals nor water-powers were seen. The only drawback to the township is the bush and difficulty of access.—*Geo. A. Grover, D.L.S., 1907.*

*Range 11.*

41. (East outline). This township is largely covered by Greenwater lake, to the south and east of which it is heavily rolling or hilly country, covered with large poplar and spruce, several timber limits being noticed in this vicinity. The soil is good and there is a bountiful supply of good water in the streams and little ponds. It is a good hunting country, evidence of bear, moose, deer and smaller game being seen. To the northeast this township is less hilly and not so heavily wooded.—*Geo. A. Grover, D.L.S., 1907...*

42. This township is reached by a good wagon trail from Crooked river, on the Canadian Northern railway, which touches it at section 31. The surface is undulating and covered for the most part with poplar and willow scrub, although patches of spruce and tamarack occur in sections 4, 5, 6, 11, 31, 32, 33 and 34, while there are also patches of open prairie throughout; the soil is perhaps best classified as second class, consisting of a light sandy loam, which however, would yield an early maturing crop, an advantage which is of great importance in a country where summer frosts sometimes do great damage. I consider that more than half of this township is suitable for grain growing. Hay could be cut on some of the open spots of prairie, but there are no hay meadows of any size. Red Deer river, which flows through this township from west to east, is an extraordinarily crooked stream with, however, a very even, clear channel of about seventy feet in width; it varies in depth from two to six feet and affords a constant supply of good water both in summer and winter. I saw no indications of minerals, stone suitable for quarrying, or coal deposits and there is no avail-

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 11—Continued.*

able water-power in this township. Moose, jumping deer, black bear, lynx and prairie-chicken are found throughout this district and there are fish in Red Deer river. There are no settlers in this township.—*R. W. Cautley, D.L.S., 1907.*

43. This township can be reached by a fair trail from Crooked river, a small station on the Prince Albert branch of the Canadian Northern railway. This trail in wet seasons is very soft in places, and following as it does many sidehills, is rather a difficult one to travel. The soil is generally a fine black loam on clay soil and would make good farming land. The surface of the township is slightly undulating and covered with bush of various kinds. Bjork lake, so named from the first settler in the neighbourhood, is a large shallow body of water that takes up much of the eastern part of the township. The shores of the lake were often marshy and both on the north and south sides are large spruce swamps. The westerly part of the township is more open, the surface being covered with poplar and willow which in places leave spots of almost clear land; this has brought in several settlers. There is some fair spruce timber up to twenty inches and large poplar up to fifteen inches in the north and south ends of the township and about the lake, though I do not think it would be sufficient for a profitable limit. It will, however, be ample for the settlers for many years to come for all classes of building. As the survey was made in winter (February) it was difficult to judge of hay and water but I should judge that both would be in fair quantity. No water-powers, minerals of value, game nor fuel other than wood, were seen. Settlement in this township has already made a good start, but owing to the large lake and neighbouring swamps, settlement will probably be slower than in the townships farther east where roads are opened up.—*Geo. A. Grover, D.L.S., 1907.*

*Range 14.*

50. This township lies six miles due east from Lost River postoffice and can be reached from there by a good wagon trail entering section 7, a distance by trail of eight miles. The soil is composed of black and sandy loam averaging six inches in depth, with a clay subsoil. With the exception of quarter sections broken by the river and muskegs the whole township should be well adapted for the growth of grain. In all probability a couple of spring fires in succession would clear most of the land. The surface, speaking generally, is brûlé poplar and willow scrub, and a dense undergrowth of weeds interspersed with occasional bluffs of poplar from four to eight inches in diameter. A quantity of spruce running up to twelve inches will be found on the east bank of the Saskatchewan river, in sections 18, 19, 30 and 31. With a small portable mill here the settlers could obtain all the lumber required in this vicinity for a long time. There is very little hay at present, except in dry years when hay of a second quality could be obtained from muskegs. Saskatchewan river enters this township in section 18, flows north and leaves from section 31. The banks run from one hundred and fifty to two hundred and fifty feet high. Nipawin rapids end in section 18. There is no water-power on this portion of the river. A long muskeg averaging about ten chains in width starts in section 17, extending northeast and leaving the township in section 36. A winter mail route from Fort à la Corne to Cumberland House runs along this muskeg. The southeast corner of this township is principally a willow swale and liable to flood; the remainder is high and free from flooding. The climate this summer was mild and clear, except a heavy rainfall in June. The first frost was noticed on August 13, but was not severe enough to affect the grain. Dead wood in abundance can be obtained for fuel. No coal or minerals were seen. Stone can be found along the river. Moose, bear, partridge and fish were found.—*R. H. Montgomery, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 14—Continued.*

51. This township lies about eight miles northeasterly from Lost River postoffice and can be reached by a good wagon trail from there running due east to range 14, thence northeasterly, entering this township in section 3, a distance by trail of fifteen miles. The soil is a sandy loam, averaging eighteen inches, with a sand subsoil, and should be adapted in portions for mixed farming. The surface is wooded, the western third and southeasterly corner being covered principally with poplar and willow scrub, the remainder with poplar, jackpine, spruce and tamarack running from four to eight inches. The only timber is a small grove of spruce, from eighteen to twenty-four inches, situated at the northeast corner of section 35, too small to be of any value. There are no hay sloughs. Saskatchewan river, with a width varying from fifteen to twenty-five chains, and a current from two and one-half to six miles per hour, enters on section 5 and leaves from section 36. Its valley has a depth varying from seventy-five to two hundred feet. Several small creeks flow into it. A large muskeg lies in the centre of the northern portion of this township, while another is situated on sections 7, 18 and 19. All water is fresh and clear. There are no water-powers. The climate this summer was mild and clear; a heavy rainfall occurred in June, the first summer frost being noticed on August 13. Dead wood in abundance can be obtained for fuel. No coal or minerals were found. Stone can be obtained from Saskatchewan river. Moose, bear, partridge and fish were seen.—*R. H. Montgomery, D.L.S., 1908.*

52. This township can be reached from Lost River postoffice by a wagon trail running east to the centre of township 50, range 14, thence north crossing Saskatchewan river on section 15, thence west to the east boundary of township 51, range 15, thence north entering this township on section 6. This trail, about twenty-two miles long, is in fair condition. The soil is a black and sandy loam, averaging from twelve to eighteen inches, with a clay subsoil, and should be well adapted for mixed farming. The surface is entirely wooded being covered principally with poplar and willow scrub. Poplar, balsam of Gilead, spruce, tamarack, jackpine, birch and balsam averaging from four to eight inches are all to be found in this township. On section 12 a small quantity of spruce, the only timber seen, will be found running up to twenty-four inches. There are no hay sloughs. Torch river, a stream about one hundred and seventy-five feet wide, nine feet deep, with a current of two miles per hour, enters on the west boundary of section 31, flows east, and leaves on the north boundary of section 33. Whitefox river, a stream about one hundred and five feet wide, eight feet deep, with a current of three miles an hour, enters on the east boundary of section 30, flows east and north and empties into Torch river at the northeast corner of section 32. Saskatchewan river flows northeast through sections 1 and 12. There are no water-powers. The climate this year was mild and clear, though a heavy rainfall occurred in June, the first frost being noticed on August 13. No coal, stone quarries or minerals were to be seen. Moose, bear and fish were noticed.—*R. H. Montgomery, D.L.S., 1908.*

*Range 15.*

41. There is a good road from Melfort on the Canadian Northern railway to Nut lake which passes through the north tier of sections of this township. The soil is second class consisting of black loam on clay and gravel subsoil and is stony in places; it is suitable for mixed farming. The surface is gently rolling and is generally timbered except in the north part, where sections 32, 33, 34 and 25 are mostly open. There are small patches of prairie throughout the township. The timber is chiefly poplar scrub with occasional bluffs of poplar from four to eight inches in diameter, and a few spruce and tamarack along Barrier river. A small quantity of hay may be cut on the prairie land in sections 32, 33, 34 and 25 and also along the valley of Barrier



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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 15—Continued.*

river in sections 27, 35 and 36. The township is well watered by the Barrier and four permanent lakes. This river flows through Otter lake in sections 30, 29 and 28 and thence through sections 27, 34, 35 and 36; it is about seventy feet wide, six feet deep, has a current of two miles per hour and lies in a well defined valley about half a mile wide and one hundred and twenty feet deep. The water is fresh and there is no land liable to be flooded except the bottom land of the river. There are no water-powers. Wood is available for fuel for the use of settlers, but there is no evidence of the existence of coal seams, quarrying stone or minerals. The climate in this district has a good average rainfall and the danger to crops from summer frosts is generally inappreciable. Moose, elk, deer, bear and lynx are still fairly plentiful in this region, and there are several kinds of fish in Otter lake and Barrier river.—*R. W. Cautley, D.L.S., 1907.*

51. This township lies about five miles due north from Lost River postoffice. It can be reached by a wagon trail running east from Lost River to the centre of township 50, range 14, thence north crossing Saskatchewan river in township 51, range 14, thence west entering this township in section 25, in all a distance of about twenty-one miles. This trail is in fair condition. The soil is a black loam, running from six to twelve inches with a clay subsoil, and should be suitable for mixed farming. The surface is entirely wooded. The portion north of Whitefox river consists of poplar four to twelve inches, balm of Gilead of the same size, spruce four to fourteen inches with willow, poplar, alder and hazel scrub, while south of the river there is poplar, balm of Gilead and spruce, four to eight inches and tamarack three to six inches with scrub. Windfall is very plentiful all over this township but there is no timber except for the settlers' use. There are no hay sloughs. Whitefox river enters in section 30, flowing east to section 23, thence north leaving from section 35. It is a stream about eighty-five feet wide, five feet deep, has a current of four miles per hour and runs in a valley about seventy feet deep. There are numerous small creeks all over this township, preventing any flooding of the land but no water-powers. A large muskeg lies in sections 23, 13 and 12. The climate was mild and clear except a rather heavy rainfall in June. The first summer frost was noticed on August 13. Deadfall in abundance can be obtained for fuel but no coal or minerals were found. Stones can be obtained in Whitefox river. Moose, bear, partridge and fish were to be seen.—*R. H. Montgomery, D.L.S., 1908.*

52. This township can be reached by a fairly good wagon trail from Lost River postoffice running east to the centre of township 50, range 14, thence north crossing Saskatchewan river on section 15, in township 51, range 14, thence east to the east boundary of township 51, range 15, thence north entering this township on section 1. On the north one-third of this township the soil is sand. The western half of the remaining portion is composed of heavy tough clay, while the remainder consists of black or sandy loam, averaging twelve inches, with clay subsoil. This portion should be suitable for mixed farming. This township is entirely wooded. The northern one-third is covered with jackpine running two to eight inches. The western part is covered with spruce up to eighteen inches, poplar to fourteen inches, balm of Gilead to fourteen inches, with dense growth of hazel. The eastern portion is covered with poplar and willow scrub interspersed with poplar, balm of Gilead and spruce averaging from six to fourteen inches. Spruce up to eighteen inches, poplar and balm of Gilead up to fourteen inches can be found scattered all over the township particularly in the western half. This could all be used as timber. There are no hay sloughs. Torch river, a stream about one hundred and seventy-five feet wide, nine feet deep, with a current of two miles per hour, enters and leaves this township on section 36, flowing



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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 15—Continued.*

east. Whitefox river, a stream about one hundred feet wide, four feet deep, with a current of four miles per hour, enters on the south of section 2, flows north, then east, leaving from section 25. Fern creek, a stream ten feet wide, one foot deep, with a current one and one-half miles per hour, enters on section 31, flows southeast, emptying into Whitefox river on section 23. There are no hay sloughs. The climate this year was mild and clear, although a rather heavy rainfall occurred in June, the first summer frost being noticed on August 13. No water-powers were found, and no coal, minerals or stone quarries were seen. Moose, bear and fish were seen.—*R. H. Montgomery, D.L.S., 1908.*

*Range 16.*

41. No wagon road enters this township at the present time but there is a good wagon road from Melfort, on the Canadian Northern railway, to Nut lake, which passes within ten chains of the northeast corner of the township and a branch road from it to the head of Otter lake, from which point the township may be reached by a boat or by a pack trail which runs south almost directly through the centre of the township. The soil is a light loam containing a great many stones and boulders in many places, but most of the four south tiers of sections, is capable of being farmed. The surface is gently rolling and heavily timbered throughout with poplar, balm of Gilead and dense underbrush. There are some bluffs of valuable spruce timber in sections 21, 27 and 28, and all the rest of the township is covered with poplar and balm of Gilead of such size that it will probably become valuable for milling purposes as soon as all the spruce in the vicinity has been cut. There is very little hay in this township except in marshes adjacent to some of the numerous lakes. The township is abundantly watered by a number of permanent lakes. Of these Otter lake, through which Barrier river flows from west to east, is the largest; it is surrounded by steep hills from eighty to one hundred and twenty feet high, is very deep and contains good water; all the other lakes contain water that is fresh but has a somewhat marshy taste. A tributary of the Barrier, flows northerly through several of the lakes and connecting marshes; it has a very sluggish current and has the nature of a slough creek. There are no available water-powers in this township. The climate of the surrounding country has a good rainfall, and the danger to crops from summer frost is generally inappreciable. There is an almost inexhaustible supply of wood fuel, but I saw no sign of the presence of coal, quarrying stone or minerals. Moose, elk, deer, bear and lynx are still fairly plentiful throughout this region. The numerous lakes and marshes give excellent feeding grounds for geese and ducks, and there are several varieties of coarse fish in the lakes.—*R. W. Cautley, D.L.S., 1907.*

42. This township is reached by a good wagon road from Melfort on the Canadian Northern railway, to Nut lake, which enters the township in section 32 and leaves it at the southeast corner. Kinistino Indian reserve No. 91 occupies fifteen square miles of this township including the northerly half of sections 1, 2, 3, 4, and 5, all of sections 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 and the southerly half of sections 20, 21, 22, 23 and 24. The soil is very good in the northerly two and one-half tiers of sections, consisting of black loam on clay and gravel subsoil but is very stony and therefore second class, although suitable for grain growing or mixed farming; the land along the south and west boundaries of the township is so stony that it is hardly fit for agriculture, although the soil is of very fair quality. The surface is gently rolling and covered with heavy poplar, balm and dense underbrush along the south and west boundaries of the township while the two and a half northerly tiers of sections are covered with poplar and willow scrub alternating with very considerable tracts of open

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 16—Continued.*

prairie. There is a saw-mill in operation on the reserve, and, although there is practically no spruce timber of any value on that part of the township surveyed by me, there is a good deal of poplar from ten to sixteen inches in diameter along the south and west boundaries of the township which will be of value for milling as soon as all the spruce in the vicinity has been cut. Small hay meadows occur throughout the township, and in the northerly part of it, upland hay may be cut on the prairies. There is a permanent supply of fresh water afforded by Barrier river, Fish creek, Leather river and seven lakes. Barrier river is about seventy feet wide, two feet deep, has a current of about two miles per hour and flows through a well defined valley from forty to eighty feet deep. Fish creek is about forty feet wide, one foot deep, has a current of two miles an hour and flows into the Barrier within the boundaries of the reserve. Leather river is a small but permanent stream flowing north and draining the northeasterly part of the township. None of this township is liable to flood and there are no natural water-powers although it would be possible to dam the Barrier at its exit from Kwatapiu lake, using the lake as a reservoir, and thus create a serviceable power. There is a good average rainfall in this part of the country and the danger to crops from summer frosts is very slight. I saw no evidence of the presence of minerals, quarrying stone or coal, but there is an abundance of wood available for fuel. Moose, elk, deer, bear and lynx are still very plentiful in this region and there are several varieties of coarse fish in the Barrier and lakes through which it passes. There are already several settlers in the township and there is every indication that all of the northerly part of it will be taken up within the next year or two.—*R. W. Cautley, D.L.S., 1907.*

51. This township lies about forty miles northeasterly by trail from Fort a la Corne. This trail runs due north from Saskatchewan river to township 50, thence northeasterly entering this township in section 19. It is in fair condition. The soil consists of a black and sandy loam with a clay subsoil and should be suitable for mixed farming. The surface is entirely covered with bush and scrub. The northern portion is covered principally with poplar and willow scrub, while the southern portion is covered with poplar, spruce and tamarack, averaging four to eight inches, interspersed with scrub. There is no timber nor hay sloughs. Whitefox river enters this township in section 19 and leaves from section 25. It has a width of about ninety feet, a depth of four feet and a current varying from two to five miles an hour. The valley is from seventy-five to one hundred feet deep. Kelsey creek flows south through sections 32 and 29 into Whitefox river. It is ten feet wide, two feet deep with a current of two miles per hour. Two large lakes lie to the south of this township, both having muskeg shores. There are no water-powers, neither are coal, or minerals to be found, but there are plenty of stones in the river. Moose, deer, bear, partridge and fish were to be seen.—*R. H. Montgomery, D.L.S., 1908.*

*Range 17.*

41. There is a rough wagon trail to Watson from Melfort on the Canadian Northern railway which passes through the most westerly tier of sections in this township. The soil is mostly second class, consisting of black loam on a clay subsoil, but in the two westerly tiers of sections the soil is much deeper and well adapted for mixed farming. The surface is gently rolling and covered throughout with poplar and willow. There is some land in the southwest corner of the township on which it would be possible to cut a certain amount of hay. The township is abundantly watered by twelve permanent fresh water lakes, which are all somewhat marshy with the exception of the lake in section 31, which I was informed, is very deep and in which the water is always

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 17—Continued.*

cold and good. No land is liable to be flooded and there are no water-powers available. There is plenty of wood for fuel for many years, but I saw no evidence of the existence of coal seams, quarrying stone or minerals. The climate is good, this part of the country being well north of the dry area and most suitable for grain growing. Moose, elk, deer, bear and lynx are still fairly plentiful in this district.—*R. W. Cautley, D.L.S., 1907.*

50. This township lies about twenty-nine miles northeasterly from Fort a la Corne by trail. This trail runs due north from Saskatchewan river to township 50, range 20, thence easterly entering this township in section 30. It is in fair condition but rather hilly near the river. The soil on the northern half is principally sand; on the southern portion it is composed of black and sandy loam, suitable for mixed farming. The surface is entirely wooded, consisting of jackpine, poplar, spruce and tamarack bush, with poplar, jackpine and willow scrub. Jackpine and spruce up to sixteen inches can be found all over the township, but not in sufficient quantities for lumbering purposes, although a portion could be used for ties. No large hay sloughs were found. There are numerous muskegs in this township, and a few small creeks affording an ample supply of good water. There is no danger of floods. No water-power is available. The climate last fall was warm and clear, with little rain. The first frost was noticed on August 20. Dead wood in abundance can be obtained for fuel. No coal, stone or minerals were found. Moose, jumping deer and partridge were seen.—*R. H. Montgomery, D.L.S., 1907.*

51. This township lies about thirty miles northeasterly by trail from Fort a la Corne. This wagon trail runs due north from Saskatchewan river to township 50, thence northerly, entering this township in section 19. This trail is in fair condition but is inclined to be hilly near the river. The soil is a black and sandy loam and should be suitable for mixed farming. This township is covered with bush, consisting of poplar, balm of Gilead, jackpine, spruce and tamarack. The south two tiers of sections are chiefly muskeg; north of this to Whitefox river there is light poplar and willow, while north of the river heavier poplar and balm of Gilead are to be found. Along the Whitefox and north of it, there is spruce, poplar and balm of Gilead up to sixteen inches but not in large quantities. Practically speaking, there is no timber in this township. There are no hay sloughs, Whitefox river crosses this township entering in section 19 and leaving from section 24. It has a width of about one hundred feet, a depth of six feet, a current of about three and one half miles per hour and runs in a valley forty feet deep. Several small creeks drain into it. Large muskegs lay across the southern part of the township. All the water is good. No water-power occurs. The climate was mild this spring and heavy rain fell in June. July was very hot. Dead wood in abundance can be obtained for fuel, but no mineral, coal or stone were to be seen. Moose, deer, bear and partridge were seen. Fish, principally jackfish and mullet are found in Whitefox river.—*R. H. Montgomery, D.L.S., 1908.*

*Range 18.*

50. This township lies about twenty-two miles by trail northeasterly from Fort a la Corne. This trail enters the township in section 19; it is in fair condition but rather hilly near Saskatchewan river. The soil is composed of sand with belts of black and sandy loam. A portion of it is suitable for mixed farming. The surface is covered with jackpine, poplar, spruce and tamarack bush, with jackpine, poplar and willow scrub. Jackpine up to sixteen inches can be found scattered throughout the township but not of sufficient quantities for lumbering purposes. No large hay sloughs were seen. Several small creeks drain this township. One large muskeg extends nearly

## TOWNSHIPS WEST OF THE SECOND MERIDIAN

*Range 18—Continued.*

across the entire north boundary. The water is all of good quality and no danger is liable to be caused by flooding. There is no water-power. The climate this fall has been mild, clear and open, the first frost being noticed on August 20. Dead wood in abundance can be obtained for fuel. No coal, stone, or minerals were found. Moose, jumping deer, and partridge were seen.—*R. H. Montgomery, D.L.S., 1907.*

51. This township lies about twenty-seven miles by trail northeasterly from Fort a la Corne. A wagon trail runs due north from Saskatchewan river for ten miles, thence northeast entering this township in section 4. This trail is in fair condition but inclined to be hilly near the river. The soil is principally a black or sandy loam, averaging about eighteen inches, with a clay subsoil and would be suitable for mixed farming. The surface is wooded, being covered with poplar, balm of Gilead, spruce, tamarack and jackpine with willow scrub. There is no timber nor hay sloughs in this township. Numerous creeks are to be found all over the township, while large muskegs are scattered in the south. Whitefox river enters this township on section 19 and leaves it from section 24; it is about fifty feet wide, ten feet deep, with a current of about four miles an hour. Bisset creek is about thirty-five feet wide, eight feet deep, and has a current about three miles per hour. There is no water-power available. The climate was mild and fine except for a rather heavy rainfall in June. Deadwood in abundance can be obtained for fuel, but no stone, or minerals were to be found. Moose, deer, and bear were seen.—*R. H. Montgomery, D.L.S., 1908.*

*Range 19.*

1. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as a country store in township 5, thence a trail to the police barracks as far as township 3 and thence going across country. The trail is a good one as far as the store, except in the spring. Beyond there it is little more than a track and hard to follow. There is an old Indian trail crossing this township leading in the direction of Weyburn. The soil is a clay loam with a hard clay subsoil. There is considerable gravel in places and alkali on the low ground. The soil might be suitable for crop raising, but the entire township with the exception of a few quarter sections is much too hilly. No timber or scrub of any kind grows in this township. Hay is very scarce as there are very few hay sloughs, particularly south of the large lakes. There are two large lakes and one somewhat smaller in this township, but they are all extremely salty. A few springs along their shores is about the only fresh water to be found. A very small stream flows into the westerly lake from the north but it is rather alkaline and dry for most of the summer. There are no water-powers. The climate is very dry. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is no fuel in the township unless there are underlying seams of lignite, but lignite is available in township 1, range 22. No stone quarries or minerals were noticed. A few antelope and duck were seen.—*I. J. Steele, D.L.S., 1908.*

4. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as township 5, range 19, thence a trail to the police barracks which passes through this township. The trail is a good one as far as township 5, range 19, except in the spring. Beyond there it is only a track and is difficult to follow. The soil is a clay loam with a clay subsoil. There is some gravel in places. The soil would be suitable for crop raising but the whole township with the exception of a few quarter sections is much too hilly. No timber or scrub of any kind grows in the township. There is considerable hay of fair quality as there are a great many

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 19—Continued.*

hay sloughs in every part of the township. These sloughs together with a few small lakes furnish a good supply of fresh water. There are no streams and consequently no water-powers. The climate is inclined to be dry but not so dry as a little farther west. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock is able to winter out without protection. No fuel whatever was found in this township but coal is available in township 3, range 21. No stone quarries or minerals were noticed. A few antelope and duck were seen.—*I. J. Steele, D.L.S., 1908.*

50. This township lies about fourteen miles northeast by trail from Fort a la Corne, and can be reached by trail running to township 50, range 20, thence due east entering the township in section 5. The condition of this trail is fair, though somewhat hilly near Saskatchewan river. The soil is generally sand with a few belts of black and sandy loam. The surface is covered with jackpine, poplar, spruce, and tamarack bush and with jackpine, poplar, and willow scrub. Jackpine, up to sixteen inches, can be found scattered all over the township, but of little value for lumbering. There are a few hay sloughs where second class hay can be obtained. There is plenty of good water to be found in ponds and muskegs, in all parts of the township, except the southeastern portion. English creek is a stream of good water, being about ten feet wide and two feet deep, and has banks about sixty feet high. There is no danger of floods. No water-power is available. The climate this summer was cool and damp, the first frost occurring on August 20. Dead wood in abundance can be obtained for fuel all over the township. No stone, coal, or minerals, were found. Moose, jumping deer, and partridge were seen.—*R. H. Montgomery, D.L.S., 1907.*

*Range 20.*

1. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as township 5, range 19, and thence a trail to the police barracks which passes through this township. This trail is good as far as township 5, range 19, except in the spring. Beyond there it is little more than a track and is hard to follow. The soil is a clay loam with a clay subsoil. There is considerable gravel in places and alkali in the low ground. It might be suitable for crop raising but most of the township is much too hilly, only a few sections in the western part being sufficiently level. Hay is not very plentiful as there are few hay sloughs. These sloughs together with a few springs in the creek valley and along the lake shore, furnish a very limited supply of fresh water. The creek itself is rather alkaline, and dry during most of the summer. The lake in the easterly part of the township is too alkaline to be of any use. The climate is very dry. The grass in this township quit growing and matured early in July. No summer frosts were noticed but there are late spring and early fall frosts. The winters are reported to be severe but stock is able to winter out without protection. No fuel, whatever, was found in this township but coal is available in township 1, range 22. No stone quarries or minerals were noticed. A few antelope and deer were seen.—*I. J. Steele, D.L.S., 1908.*

2. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as township 5, range 19, thence a trail to the police barracks passing through this township. This trail is good as far as township 5, range 19, except in the spring. Beyond there it is little more than a track and hard to follow. The soil is a clay loam with a clay subsoil. There is considerable gravel in places, and alkali on the low ground. The soil in places might be suitable for crop raising but the entire township is much too hilly. No timber or scrub of any kind grows in the township. Very few hay sloughs are found in the township but there

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 20—Continued.*

is considerable hay of fair quality in the creek valley. These sloughs furnish the only supply of fresh water. The creek running through the township is slightly alkaline and is dry most of the summer. The lake in section 18 is also alkaline. There are no water-powers on the creek. The climate is very dry. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is no fuel whatever in the township unless there are underlying seams of coal, but coal is available in township 3, range 21. No stone quarries or minerals were found. A few antelope and duck were seen in this township.—*I. J. Steele, D.L.S., 1908.*

3. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as a country store in township 5, range 19, from there a trail to the police barracks as far as township 3, range 19 and thence across country. This trail is a good one as far as the store, except in the spring. Beyond there it is little more than a track and hard to follow. The soil is a clay loam with a hard clay subsoil and considerable gravel in places. The soil might be suitable for crop raising but the entire township, with the exception of a few sections in the northeasterly corner, is altogether too hilly. No timber or scrub of any kind grows in this township. Hay is rather scarce as there are very few hay sloughs. There is a fair supply of fresh water supplied by those sloughs and a number of small lakes and reedy marshes. There are no streams, and, of course, no water-powers. The climate is very dry. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock is able to winter out without protection. There is no fuel within the township unless there are underlying seams of coal, but coal is obtainable in township 3, range 21. No stone quarries or minerals were noticed. A few antelope were seen in this township.—*I. J. Steele, D.L.S., 1908.*

4. This township is most readily reached from Weyburn by taking what is known as the 'Gap' trail as far as township 6 and thence going across country. This trail is a good one, except in the spring. The soil is a clay loam with a clay subsoil. There is considerable gravel and stone in places. The soil might be suitable for crop raising but most of the township is much too hilly, particularly the western part. No timber or scrub grows in the township. There is a fair quantity of hay, as quite a few hay sloughs are scattered throughout the township. These sloughs with several fresh water lakes form a good supply of fresh water. The lake at the northeast corner of section 16 is slightly alkaline. There are no streams and consequently no water-powers. The climate is very dry. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is no fuel whatever in this township, but lignite is available in township 3, range 21. No stone quarries or minerals were noticed. A few antelope and duck were seen.—*I. J. Steele, D.L.S., 1908.*

*Range 21.*

2. This township is most readily reached from Weyburn by taking what is known as the 'French' trail as far as a country store in township 5, range 19, thence a trail to the police barracks as far as township 2, range 20, and thence across country. This trail is a good one, except in the spring, as far as the country store. Beyond there it is little more than a track and hard to follow. The soil is a clay loam with a hard gravelly clay subsoil. There is a good growth of grass south of the lake which would seem to indicate a fairly good soil but owing to the dry climate and hilly nature of the country it is probably only suitable for grazing. This entire township may be



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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 21—Continued.*

described as hilly prairie and there is no timber or scrub whatever found within its limits. There is very little hay found in the township as there are few hay sloughs. Big Muddy lake extends right across this township from the east boundary of section 13 to the west boundary of section 36. It is quite alkaline but stock will drink it. There are a few springs along its banks which furnish about the only fresh water to be had and the supply is very limited. There are no streams, and of course no water-powers. The climate is very dry. No summer frosts were noticed, but there were late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is no fuel within the township unless there are underlying seams of coal, but coal is obtainable in township 1, range 22, and township 3, range 21. An outcrop of stone was seen in sections 22 and 23 on the lake shore. It appeared to be a rather shaly sandstone and rather soft. It would not be very suitable for building purposes. No minerals were noticed. A few antelope, duck, geese and pelicans were seen in this township. Numerous pieces of petrified wood were found along the shore of the lake.—*I. J. Steele, D.L.S., 1908.*

3. This township is most readily reached from Weyburn by taking what is known as the 'Gap' trail as far as township 6, thence turning south on one of the wood trails that reach down into this township. This trail is a good one except in the spring. The soil is a clay loam with hard clay subsoil. There is considerable gravel and stone in places. The soil might be suitable for crop raising but the entire township with the exception of a few sections is much too hilly. No timber grows in this township. A very little scrub ash and willow is found in some of the ravines but most of it has already been taken by the settlers to the north. Hay is rather scarce in this township as there are very few hay sloughs. A bay of Big Muddy lake extends into sections 5 and 6. The water is rather alkaline but stock will drink it. A number of springs in sections 6 and 7 give a good flow of fresh water. There is also a fresh water lake in section 24 and some marshes in a large coulée running through the township. There are no streams and of course no water-powers. The climate is very dry. No summer frosts were noticed but there were late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. A lignite seam has been opened up in section 17 and furnishes fuel for all the settlers within reach. Numerous outcrops of limestone were noticed along the sides of the main coulée running from section 36 to section 5. It appeared to be a good quality of building stone. No minerals were noticed. A few antelope and duck were seen in this township.—*I. J. Steele, D.L.S., 1908.*

4. This township is most readily reached from Weyburn by what is known as the 'Gap' trail as far as township 6, range 20, and thence going across country. This trail is a good one except in the spring. The soil is a clay loam with a clay subsoil with considerable gravel in places. The soil might be suitable for crop raising but the entire township with the exception of a few quarter sections is much too hilly. No timber or scrub of any kind grows in the township. Hay is plentiful and of fair quality as there are numerous hay sloughs scattered throughout the township but more particularly in the central part. The sloughs together with a small lake in section 34 form the only supply of fresh water. The large lake in the easterly part of the township is much too salty to be of any use. There are no streams and consequently no water-powers. The climate was very dry. No summer frosts were seen but there were numerous late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is no fuel whatever in this township unless there are underlying seams of lignite. Lignite is available in township 3. No stone quarries or minerals were noticed. A few antelope and duck were seen.—*I. J. Steele, D.L.S., 1908.*



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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 21—Continued.*

46. This township is somewhat similar to township 46, range 22. The surface is slightly rolling. Poplar bluffs and poplar and willow scrub cover a larger portion of the ground. The timber is not large enough or suitable for lumber. On every section there is timber large enough for rough log buildings. The soil is a sandy loam of good quality, with a clay subsoil. It raises good grain crops and excellent roots and other vegetables. The most of the grain was cut in time to escape much damage by frost this year, but last season as in many other districts, it was badly damaged. The whole township is broken by sloughs and lakes. A large body of water lies in section 30 with a good deal of swamp around it, but another with good shores lies in section 21. A very much broken and irregular one is found in sections 36 and 26. A large lake containing small scattered islands breaks the east boundary of section 36, and another surrounded by small hills takes up a good portion of the northeast quarter of section 24. The strip on the east side of the township consisting of sections 1, 12 and 13, is very much broken by sloughs. None of these bodies of water appear to have outlets. The water in nearly all the sloughs and lakes is alkaline, to some extent, but not enough to make it unfit for stock. Carrot river crosses the township, flowing northerly through a narrow valley in a very crooked channel from twenty to thirty-five feet wide and three to four feet deep. It skirts the east boundaries of sections 22, 27 and 34. Nearly all the sloughs are surrounded by strips of good hay land. No large amount can be procured in one place. The district is well adapted for mixed farming. It is an excellent cattle and dairying country. No water-power of practical use is available other than a small power that could be developed on Carrot river by flooding a considerable area of land. It would not be permanent and of no use in winter. No minerals of economic value were seen. Ducks were plentiful, other wild fowl were scarce, but coyotes, skunks and badgers were often seen. Most of the even sections are taken up, mainly by Scandinavians from Europe and the northwestern United States. They are making good progress and bid fair to make good farmers. A graded road made by the Saskatchewan government runs through the township on the road allowance on the east boundaries of sections 19, 30 and 31. It extends north across Peonan creek in the north township and south to the town of Kinistino.—*W. R. Reilly, D. L. S., 1908.* •

51. This township lies about twenty miles by trail northwesterly from Fort a la Corne. This wagon trail runs north, from Saskatchewan river, to the north of township 50, range 20, thence northwesterly to this township entering it in section 13. The condition of this trail is good but rather inclined to be hilly near Saskatchewan river. North of Whitefox river the soil is black loam, averaging twelve inches, with clay subsoil, and should be suitable for mixed farming. South of Whitefox river the soil is sand. The surface is wooded, or scrubby, covered with poplar north of the river, and jackpine, spruce, and tamarack south of it. There are large patches of scrubby poplar and willow. The timber in this township consists of jackpine, poplar, balm of Gilead, spruce and tamarack. There are several large hay sloughs north of Whitefox river, from which a large quantity of good slough hay could be obtained. Whitefox river has a width averaging forty feet with a variable depth from two to ten feet, and has a current of two and one-half miles per hour. The water is excellent. The river enters in section 6, and running in an east northeasterly direction leaves the township in section 13. Large muskegs lie south of the river. There is no water-fall available. The climate this summer was cool and damp, the first frost being noticed on August 20. Deadwood in abundance is available for fuel. No stone, coal, or minerals are to be found. Moose and jumping deer are plentiful.—*R. H. Montgomery, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 22.*

1. This township is most readily reached from Weyburn by taking what is known as the 'French' trail to a small country store in township 5, range 19, thence a trail which passes around the east end of Big Muddy lake to the police barracks. This trail is a good one as far as the store, but beyond there it is little travelled and hard to follow and in the spring is practically impassable. The soil is a clay loam with a hard clay subsoil and might be suitable for agricultural purposes if the ground were not so rough. In the Big Muddy valley there is too much alkali to permit of cropping. A rancher had a small field of oats in section 3 but they did not seem to be growing well. This entire township is very much broken up by deep ravines running into the Big Muddy valley which render it unfit for anything but ranching. There is no timber but a few clumps of small poplar and scrub grow in the ravines. There are no hay sloughs in this township, but hay of excellent quality grows in most parts of the Big Muddy valley, so that the possible yearly cut would be a good many hundred tons. Springs furnish about the only water in the township. The best one is at the police barracks, but another good one was seen in section 24. There are numerous other smaller ones in the township some of which are salty. There are of course no water-powers. The climate appeared to be very dry. There are late spring and early fall frosts but none were noticed in midsummer. The winters are said to be severe but less snow falls than a little farther west. In the fall there were several inches of snow on the uplands when there was none in the valley. For fuel there is an abundance of coal in the township and also a little scrub. Indications of coal were seen in a great many places and a pit has been opened in section 16. It is a lignite of fair quality but disintegrates rather rapidly when exposed to the weather. A few pieces of crystalline gypsum were picked up but no other mineral or stone quarries were seen. No game was seen in the township.—*I. J. Steele, D.L.S., 1908.*

2. This township may be reached from Weyburn by taking what is known as the 'French' trail as far as a country store in township 5, range 19, thence a trail to the police barracks as far as the east boundary of township 1, range 22, and thence going across country. This trail is a good one as far as the store except in the spring. Beyond that the trail is little more than a track and difficult to follow. The part of the township north of Big Muddy lake is probably best reached by taking the 'Gap' trail from Weyburn to within a few miles of Livingstone's ranch, thence going across country. The soil is a clay loam with a hard clay subsoil. A few quarter sections north of the lake might be suitable for crop raising but are rather hilly. On the south side of the lake this township is extremely hilly and entirely unfit for anything but grazing. There is no timber of any size but considerable poplar and willow scrub grows on the north hillsides south of the lake. None is found north of the lake. Hay is not very plentiful, but some grows in the Big Muddy valley in sections 2 and 3. There is a good growth of grass in many of the ravines but it could hardly be utilized for hay. The water in Big Muddy lake is alkaline but range stock will drink it. The only fresh water obtainable comes from a few springs in the ravines along the shores of Big Muddy lake. There is quite a flow from a spring in section 18, but the rest are all very small. A few sloughs north of the lake supplement the supply a little. There are no streams and consequently no water-powers. The climate is very dry. No summer frosts were noticed but there are late spring and early fall frosts. The winters are reported to be severe but stock can winter out without protection. There is a small quantity of scrub in the ravines south of the lake which may be used for fuel, but the supply is very limited. Indications of lignite were seen but no seams have been opened. Lignite is obtainable in township 1. No stone quarries or minerals were noticed. No game was seen in this township. All this township north of Big Muddy lake is included in Livingstone's range.—*I. J. Steele, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 22—Continued.*

44. This is a poplar bluff country with large prairie openings and many sloughs, lakes and patches of swamp. The bluffs are formed by young growing poplar in many places ten inches in diameter, clumps of willows, poplar and willow underbrush. They supply abundance of fuel, fencing and rough building material. The heaviest clumps and belts are found on the west sides of sections 19 and 30 and the south parts of sections 4, 5 and 6. The surface is flat in the northeast corner of the township, undulating to rolling in the interior, gradually rising to a hilly country in the townships to the south and west. A small creek enters the township in the southwest corner of section 6, meanders through sections 6, 7 and 17 and is joined in section 16 by a branch from the south, through sections 4 and 9. From section 16 it continues through sections 21, 22, 27, 26 and 35 passing through swamps and lakes into a large swamp on the east boundary of the township. This swamp extends northeasterly for several miles, draining into Carrot river in township 45, range 21. The water in this creek above the swamp is excellent. Six lakes were traversed. The lake in sections 22 and 27 and the one in sections 28 and 29 are materially different to what is shown on the original plan. It is a good township for stock raising and dairying. It has special advantages for the settlers in being well watered, good soil, abundance of hay and fuel and a liberal supply of fencing and rough building material. A number of settlers have taken up homesteads. They are making good progress and apparently doing well. Ducks are plentiful. Prairie-chickens and other wild fowl are scarce. Coyotes, muskrats and badgers were often seen. No trace of other fur bearing animals was noticed. No minerals of economic value were noticed and no water-power nor stone of any kind was found. The Saskatchewan government has done this season a considerable amount of grading on a road on the east boundaries of sections 15 and 22, extending into section 26.—*W. R. Reilly, D.L.S., 1908.*

46. This township, which is fractional, is rolling in the southwestern portion, while undulating in the north and northeastern portions. A considerable portion of the township is covered with poplar and willow bluffs. The poplar in all cases grows large enough for fence rails, and the willow for fence pickets. In the east and north-west of the township there is a quantity of poplar large enough for rough building purposes. Peonan creek runs across the northwest corner of the township. It enters about twenty chains south of the northwest corner of the township and meanders across the north half of sections 31, 32 and 33, leaving the township a few chains east of the northeast corner of section 33. This creek contains excellent water and does not dry up in the summer. It is from ten to twenty-five feet wide and two to four feet deep. A succession of lakes and sloughs, which I traversed, cuts the southwestern portion of the township. A large one with swampy shores cuts sections 35, 36, 25 and 26. Another lake on the east boundary cuts section 25. The water in these lakes and sloughs is slightly alkaline, but not strong enough to injure stock. The soil is a loam of good quality and produces good crops of wheat, oats, barley and excellent roots and other vegetables. Most of the homesteads have been taken up. The settlers are mostly Scandinavians from the northwestern United States, who appear to be very prosperous. They have made permanent improvements and in a short time will have excellent farms. A considerable amount of road improvements have been made. The road on the east side of sections 29 and 32 and on the north side of 21 and 22 has been graded. The Canadian Northern railway cuts the township from section 31 to section 22. There is no water-power available in this township and no minerals of economic value were met with. Ducks were numerous. Prairie-chickens are plentiful, but geese and sand-hill cranes are scarce. Coyotes, skunks, gophers, and other fur bearing animals were seldom met with.—*W. R. Reilly, D.L.S., 1908.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 22—Continued.*

49. This township, like township 49, range 23, is cut in two by Saskatchewan river which enters at the southwest corner of section 31. It flows in a very zigzag course across the township, being joined in the southwest corner of section 24, by the south branch. The banks are much the same as in range 23, from twenty to one hundred feet high, alternating from one bank to the other. Generally where one side is high the other will be low. The stream is much swifter than in range 23, being virtually a succession of rapids from the west boundary to where it is joined by the south branch. A ferry was being put in by the Saskatchewan government a few chains east of the west boundary. The part of the township lying north of the river slopes back to a height of about two hundred feet, from the river. Section 31 is rolling in the north with long slopes to the south towards the river. It has some scattered openings and is the only part north of the river that can be said to be fit for cultivation. From sections 31 to 36, along the north boundary are spruce and tamarack swamps or muskegs with intervening jackpine ridges. The river valley is formed by ranges of hills that stretch from bend to bend. Between the bends are large flats which are covered with poplar and willow. In the flats in sections 26 and 27 are two crescent-shaped swamps; these are apparently old beds of the river. A heavy belt of poplar from six to twelve inches in diameter covers the ground between these swamps and a large amount of young poplar covers the flats in sections 22, 23 and 24. Small swamps and jackpine ridges with patches of poplar cover the remainder of the township. A large amount of poplar is large enough for building and other purposes. A good deal of jackpine is scrubby. It is not very heavy or extensive in any place, but by going over the whole area, a large amount of railway ties could be made. The soil in section 31 and in the flats along the river is a good rich loam with a sandy subsoil, while most of the remainder of this part of the township is light sand. No minerals or stone quarries were found. Game was scarce, some traces of mink, foxes, coyotes, &c., were noticed. A few jumping deer were seen.—*W. R. Reilly, D.L.S., 1908.*

*Range 23.*

1. (South outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate, might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found, but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

2. This township is most readily reached from Weyburn by taking what is known as the "Gap" trail to Livingstone's ranch, thence a trail to the police barracks which passes through this township. This trail is a good one except in the spring. The soil is a clay loam with a hard clay subsoil and considerable gravel in places. The easterly part of the township is very much broken by deep ravines while the rest is very hilly and broken by dry valleys. With the exception of a very few quarter sections, this township is fit only for ranching. There is no timber but a little scrub was seen in some of the ravines in the easterly part of the township. Very little hay was seen in this township, a few sloughs in the northerly part being the only source of supply.

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 23—Continued.*

Big Muddy lake extends into section 24, 25 and 36. The water is alkaline but ranch stock will drink it. The few sloughs previously mentioned form the only other source of supply. There are no water-powers as there are no streams. The climate is very dry. No summer frosts were noticed, but there were late spring and early fall frosts. The winters are reported to be rather severe but ranch stock need no protection. There is practically no fuel within the township unless there are underlying seams of coal, as the little scrub growing in the ravines is scarcely worth mentioning. Scrub is available in the township to the east, and coal in township 1, range 22. No stone quarries or minerals were seen. With the exception of a few duck no game was noticed in this township.—*I. J. Steele, D.L.S., 1908.*

49. This township is cut in two by Saskatchewan river. It enters the township on the west at the northwest corner of section 18 and flows with several large bends in a northeasterly direction to the southeast corner of section 36. Its banks are broken and vary from twenty to one hundred feet high alternating from one bank to the other. Generally where it is high on one side it is low on the opposite. The current is swift in high water with no rapids of any account. In low water several strong rapids are formed. The country north of the river gradually rises to the north to a height of about two hundred feet above the river. The surface is rolling with slopes, flats and steeps, with a heavy growth of poplar in most places; the heaviest on the west side of the township. A few scrubby openings occur on sections 36 and 35. Many large patches of swampy ground are found, dotted with clumps of willow. Garden river meanders from the northwest corner of section 32, through sections 32 and 29, and empties into the Saskatchewan on the east side of section 20. It is from thirty to forty feet wide and from one to four feet deep with a rapid current. The country south of the Saskatchewan, with the exception of a short distance from the river, which is broken, is but slightly rolling and generally flat along the south part of the township. The greater part of the south half of section 18, sections 7 and 6, and a part of sections 8 and 5 has been covered with a heavy growth of thrifty jackpine, a great quantity of it being large enough for railway ties, but the most of it has been pretty well run over, and a great amount of building and other material taken off it. Heavy bluffs of poplar are found on most sections, this being a poplar bluff country with large scrubby openings. A number of sloughs are scattered over the township. They are more numerous in the southeast quarter of the township. Two large lakes, one cutting sections 15, 10 and 11 and the other sections 11 and 12 were traversed. A small spring creek with excellent water runs through section 18. Another one known as Steep creek runs through sections 15 and 22. Away from the jackpine ridges the soil is good, mostly a dark sandy loam with a sandy subsoil. Hay and water are plentiful, also fuel and rough building material. The most of the homesteads on the south side of the river are taken up and a couple of farms on odd sections are being worked. Generally speaking the country has a backward appearance. Hay of good quality in limited quantities can be gathered from around most of the sloughs throughout the township. Upland hay can be cut in several places. It is limited in quantity and not of the best quality as the ground is brushy and weedy. This is a good mixed farming district and an excellent cattle and hog raising district. Steep Creek postoffice is on the southwest quarter of section 24.—*W. R. Reilly, D.L.S., 1908.*

*Range 24.*

1. (South outline). This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 24—Continued.*

Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate, might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

1. (East outline). This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate, might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

2. This township is best reached from Weyburn by taking what is known as the 'Gap' trail to Livingstone's ranch thence taking the trail in the Big Muddy valley to George's ranch in section 27, township 3, thence across country. This trail is good except in the spring. The soil is a clay loam with a hard dry clay subsoil and would be suitable for agriculture if the surface were sufficiently level. There is no timber or scrub in this township. It is very much cut up with dry coulées which make it unfit for farming except in a few sections. There is no hay whatever. Two branches of Beaver creek pass through the township but both were almost dry at the time of the survey (September) and no doubt are dry for most of the season. These streams are the only source of supply of water as there are practically no sloughs in the township and no springs were seen. The climate was very dry, particularly in the summer. There are late spring and early fall frosts which would make farming a doubtful proposition and the winters are reported to be rather severe. No stone quarries or minerals were seen. A small quantity of dead poplar scrub in the township to the north is available for fuel but there is not sufficient to last any length of time. Lignite coal of an inferior quality is found in the township to the north and also in township 1, range 22, and no doubt could be found nearer at hand. No game was seen but there are supposed to be a few antelope in the locality.—*I. J. Steele, D.L.S., 1908.*

3. This township is most readily reached from Weyburn by taking what is known as the 'Gap' trail as far as Livingstone's ranch, thence following the trail in the Big Muddy valley, which passes through this township. This trail is good except in the spring. On the upland the soil is a clay loam with a hard clay subsoil. In the valley the soil is what is known as gumbo. During the wet spring weather it is very soft but dries out hard in the summer. No large timber grows in this township but there is considerable scrub in some of the ravines which cut up most of the township and make it entirely unfit for anything but ranching. A very small quantity of hay grows around a few sloughs in the southerly part of the township but not enough to be of much value. These sloughs, together with a few springs in the ravines, furnish the only supply of water. Most of the sloughs dry up in summer but the springs are fairly permanent. There are no water-powers. The scrub in the ravines is available for fuel



## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 24—Continued.*

but is limited in quantity. There are plenty indications of lignite in this township but no seams were found. No stone quarries or minerals were seen. A few prairie-chicken were the only game seen but there are supposed to be a few antelope in the locality. The climate is very dry, particularly in the summer. There are late spring and early fall frosts on the uplands but in the Big Muddy valley it seems to be warmer. At the time of survey (September) there were several inches of snowfall on the upland but none in the valley.—*I. J. Steele, D.L.S., 1908.*

47. This is a fractional wooded township. An Indian reserve covers the greater part of the north half of it. The surface is rolling in the southwest quarter, and slightly rolling in the southeast quarter of the township. It is comparatively level in sections 24, 25 and 36, and along the Indian boundary. Many fresh water sloughs of small extent dot the south part of the township. In the north they are more numerous and larger, covering a considerable part of the surface. A large marsh extends across section 3 into the north part of section 4. A drain has been dug in this marsh through section 4 into section 5, following a small creek running through section 6. Large prairie openings occur in the south part of the township and a few small scrubby openings in the north. Poplar, with willow, alder and hazel bush cover the greater part of the surface. Clumps and belts of poplar with timber large enough for rough building, fencing and fuel are found on every section. Hay of good quality is fairly plentiful in the tier of sections along the south boundary. A large quantity can be cut from many sloughs in all parts of the township. The soil is a good quality of loam, and will produce good grain, roots and other vegetables. The ground is much broken with sloughs which impair its value for farming purposes. On the other hand the close proximity of a railway station enhances its value to a great extent. The south branch of Saskatchewan river cuts the west boundaries of sections 7 and 18. A small lake was traversed in sections 10 and 11. No water-power nor minerals of economic value were found, and no stone except boulders along the river. Ducks were plentiful, but small fur bearing animals scarce, and there were no signs of large game. A number of homesteads have been taken up recently and a small amount of improvements made. A few old settlers in the south part of the township have large improvements. —*W. R. Reilly, D.L.S., 1908.*

*Range 25.*

1. (South outline). This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks, and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

2. This township may best be reached from Weyburn by taking what is known as the 'Gap' trail to Livingstone's ranch, thence following the trail in the Big Muddy valley to Ange's ranch, thence across country. The trail is a good one except in the spring. The soil is a clay loam with a hard white clay subsoil with considerable gravel in places, particularly in the northern part of the township. There is absolutely no



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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 25—Continued.*

timber or scrub in this township. Most of the township is badly cut up with coulées and the northern part is very hilly. In the southern part there are a few sections which are fairly level and might be suitable for farming, but most of the township is fit only for ranching. There are no hay sloughs but there is a fairly good growth of grass in some of the coulées which might be used for this purpose. A very small creek crosses the south boundary of section 5 but it is dry a little farther north and is no doubt entirely dry during most of the season. In the northern part of the township there are a few small springs which furnish a limited amount of good water. There are no water-powers, and no stone quarries or minerals were seen. No game was seen but there are supposed to be a few antelope in the vicinity. The climate is usually very dry, particularly in summer. There are late spring and early fall frosts, and the winters are said to be very severe.—*I. J. Steele, D.L.S., 1908.*

3. This township is most readily reached from Weyburn by taking what is known as the 'Gap' trail to Livingstone's ranch, thence following the trail in the Big Muddy valley which passes through this township. This trail is good except in the spring. On the upland the soil is a clay loam with a hard dry clay subsoil and considerable gravel along the south boundary. In the valley the soil is known as gumbo. During the wet spring weather it is very soft but dries out hard in the summer. No large timber grows in this township but there is considerable scrub in the ravines and on the north slope of the hills. The surface is extremely broken and a high range of hills extends across the south part of the township forming a watershed. There are very few quarter sections that are level enough for farming purposes. No hay grows in this township except a little in section 14. The only available water is from a few small springs in the ravines and along the edge of the Big Muddy valley and in a small lake extending into section 7 from range 26. The supply is fairly permanent but limited. There are no water-powers. A considerable quantity of scrub in the ravines and on the north slope of the hills is available for fuel but is rapidly disappearing as the settlers to the north secure fuel here. No coal or lignite veins were found although there were traces of lignite in places, and no stone quarries or minerals were seen. No game was seen but there are supposed to be a few antelope in the vicinity. A rancher in section 31 manages to raise some oats and potatoes but the land has to be irrigated.—*I. J. Steele, D.L.S., 1908.*

47. This is a fractional township, which consists of a part of section 1 and the southeast corner of section 12. It is bounded on the northwest side by the south branch of Saskatchewan river. The river bank rises to a height of about one hundred feet above the water. It is heavily wooded with poplar of small size and a thick growth of willow, poplar and alder underbrush. A small creek in a deep ravine with high sloping wooded banks runs through the south half of section 1. South of the creek the land is rolling with scattered bluffs of poplar and clumps of willow and poplar brush. North of the creek the ground is rolling and heavily wooded with young growing poplar averaging five to ten inches in diameter. A large part of it is pretty free from underbrush, but in other places tangled willow and alder grow. The soil is a rich black loam on a clay subsoil. A small quantity of hay can be cut from odd fresh water sloughs in the south part of the township. The land is vacant and no improvements have been made. No minerals and no water-powers were found and no stone except boulders along the river. Game was very scarce.—*Wm. R. Reilly, D.L.S., 1903.*

49. In the immediate vicinity of Saskatchewan river the soil is first class and timbered with poplar and willow. More remote from the river the soil is a scrubby muskeg or rolling sand hills covered with jackpine. There is a fairly good summer

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 25—Continued.*

trail leading from Prince Albert ferry through this township. All the water is fresh and of excellent quality. I saw no hay meadows or water-powers. There were no frosts during the survey, but there were two hail storms. There is an abundance of wood for fuel and other purposes. No quarries or minerals of any kind were seen. There is, however, an abundance of building sand and brick clay, and brick is manufactured in section 22. Deer was the only game seen.—*Geo. McMillan, D.L.S., 1908.*

*Range 26.*

1. (South outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found, but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

1. (East outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found, but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

2. This township may be reached from Moosejaw by taking the Willowbunch trail to Willowbunch then the Scobie trail running southerly which enters this township on section 19. It may also be reached from Weyburn by taking what is known as the "Gap" trail to Livingstone's ranch, thence following the trail in the Big Muddy valley to Holly's ranch at the northeast corner of township 3, thence taking one of Holly's hay trails to within a mile or two of the north-boundary of the township. The soil is a clay loam from two to ten inches deep but in the southerly part of the township there is considerable gravel. The subsoil is a hard, white, gravelly clay. The soil in some places might be suitable for agriculture but the whole township with the exception of two or three sections is too hilly and broken and the climate is so unsatisfactory that this township is probably more suitable for ranching purposes. No timber or scrub grows in this township and the surface as stated above may be described as hilly prairie, the hills having no regularity or definite formation. There is some hay slough, about twenty acres in extent, in section 25 and a certain amount of hay is obtainable along the creek which runs through the western part of the township. This fresh water creek is about three-feet wide and a few inches deep and with the exception of a few sloughs in the northeasterly part is the only water in the township. There are no water-powers on it. The climate is very dry, particularly in the summer,

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 26—Continued.*

and the winters are reported to be long and severe. There are also summer frosts. No stone quarries or minerals were discovered. A few duck was the only game seen but there are supposed to be a few antelope in the locality.—*I. J. Steele, D.L.S., 1908.*

3. This township is most easily reached from Weyburn by taking what is known as the 'Gap' trail to Livingstone's ranch, thence following the trail in the Big Muddy valley to Holly's ranch, which is at the northeast corner of the township. This trail is good except in spring. The soil is a clay loam with a hard, dry, clay subsoil and might be suitable for crop raising if other things were favourable. There is no timber in this township but a little scrub grows in the northerly part. The surface is rather broken, particularly in the northeast corner and along the north boundary. There are a few small hay sloughs in the east half of the township, but the hay is rather coarse and inferior and in no great quantity. A small lake of good fresh water covers parts of sections 1 and 12 which will probably not go dry. There is also a small fresh water creek running through sections 6 and 7 which does not go dry. At the time of the survey (October) it was about three feet wide and eight inches deep. There are no water-powers on it. The few hay sloughs dry up early and are of little importance. The climate is generally very dry, particularly in the summer. There are late spring and early fall frosts, and the winters are said to be severe. A small quantity of scrub is available for fuel in the northerly part of the township and there is considerable in township 3, range 25. No coal or lignite veins were found, nor were any stone quarries or minerals seen. No game was seen but there are supposed to be a few antelope in the locality.—*I. J. Steele, D.L.S., 1908.*

*Range 27.*

1. (East outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate, might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

1. (South outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to the Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch, thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate might be better adapted for ranching. There are very few sloughs in the township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry, particularly in the summer, and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

2. This township may be reached from Moosejaw by taking the Willowbranch trail to Willowbunch, thence a trail going southerly which enters this township on the north boundary section 35. It may also be reached from Weyburn by taking what is known

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## TOWNSHIPS WEST OF THE SECOND MERIDIAN.

*Range 27—Continued.*

as the 'Gap' trail to Livingstone's ranch, thence following the trail in the Big Muddy valley to Holly's ranch at the northeast corner of township 3, range 26, thence across prairie to this township. The soil is a clay loam from two to ten inches in depth but in many places there is considerable gravel. The subsoil is a hard, white, gravelly clay. In the northerly part of the township there is a good growth of grass, appearing to indicate a fairly rich soil which might be suitable for agricultural purposes if other conditions were favourable. In the southerly part of the township there seems to be more gravel and some alkali in the vicinity of the creek running across the township. No timber or scrub whatever is found in this township and the surface as a whole may be described as rolling with the exception of some hills in sections 30 and 31 and in sections 26, 27, 34 and 36. There are no hay sloughs in this township but there is a fairly rank growth of grass in some places along the creeks which might be utilized for hay. A fresh water creek three feet wide and a few inches deep runs through section 36 which does not appear to go dry and there is also a creek entering the township on the west boundary of section 18 and leaving it at the south boundary of section 2, but it dries up in the dry season. However, a number of springs along its banks make a permanent supply of excellent water for all ordinary purposes. Neither stream is large enough for water-powers. There are no sloughs and no lands subject to floods. The main feature of the climate in this locality is the lack of rain during the summer which would be the principal drawback to grain raising, although there would also be considerable danger from summer frosts. It is understood that the winters are rather long and severe. There is no fuel whatever in this township unless there are underlying coal seams, which is quite possible as there are indications of coal not far away. A certain amount of scrub along the Big Muddy valley is available for fuel. No game was seen in this township with the exception of a few duck but it is understood that there are a few antelope in this locality. All things considered, this township would not make very good farming land but ought to be excellent for ranching purposes.—*I. J. Steele, D.L.S., 1908.*

*Range 28.*

1. (East outline.) This township may be reached from Weyburn by taking what is known as the 'French' trail to the Diamond crossing at the east end of Big Muddy lake, thence taking the police trail to Big Muddy barracks and thence the Willowbunch police trail westerly; it may also be reached from Moosejaw by taking the Willowbunch trail to Willowbunch thence the Scobie trail southerly. This township is not quite as hilly as the townships to the north and in places is fairly level. The soil in places might be suitable for agriculture, but owing to the dryness of the climate, might be better adapted for ranching. There are very few sloughs in this township. No timber or scrub whatever is found but there are indications of coal suitable for fuel. The climate is very dry particularly in the summer and the winters are reported to be very severe.—*I. J. Steele, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 1.*

23. From the northeast corner of this township it was about ten miles to the village of Craik, a station on the Canadian Northern railway, the trail being in a fairly good condition and most of the way the roads have been graded. Here there are several elevators, a bank, two hotels and numerous mercantile establishments. From the southwest corner of the township it is about nine miles to Tugaskie, a station on the Moosejaw to Outlook branch of the Canadian Pacific railway. There are elevators,

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 1—Continued.*

stores, a bank and boarding houses here, and a good trail leading right to this settlement or to Eyebrow, the next station on the line, about the same distance from this township. The soil is a black loam with generally a sandy subsoil and is suitable for raising the different kinds of cereals as well as vegetables. It consists mostly of undulating open prairie without any timber or brush whatever. There are a number of small grassy ponds but most of the hay made here is obtained from the uplands. The water in the ponds is mostly good as is also the case in the wells dug by the settlers. There are no running streams except Squaw creek in which the water becomes very low in summer time. The climate is normal and not much subject to summer frosts. There is no fuel but what is obtained from the sand hills to the west or from the near by railway towns. No stone quarries nor any minerals were observed. No game was seen with the exception of a few ducks in ponds and marshes. This township is well settled and no more land is available for homesteading purposes, although that held by private companies and individuals is obtainable at fair prices.—*C. F. Miles, D.L.S., 1908.*

42. This township is traversed by Saskatchewan river and can be reached by an excellent trail by either of two routes, from Duck Lake settlement or Rosthern. There is a ferry crossing the river at the northeast corner of section 18 which is known as 'Gabriel's' crossing. East of the river the surface is rolling and covered with poplar, willow and scrub with many open spaces. The soil is fairly good although not cultivated to any great extent, it is largely used for grazing. West of the river it is a hilly, sandy, uncultivated prairie. The water supply is everywhere abundant and of good quality. The climate is excellent and there were no summer frosts. I saw no game, no quarries or other minerals. There are no water-powers although the Saskatchewan has a steady current. Its banks are high and the adjacent lands are not subject to floods.—*Geo. McMillan, D.L.S., 1908.*

43. This township is cut into by the St. Laurent settlement and One Arrow Indian reserve. It can be reached by trail from Duck Lake settlement as there is a ferry crossing the south branch of the Saskatchewan at Batoche. The soil is a sandy loam and is suited for stock raising or real farming. The surface is rolling and about thirty per cent prairie; the remainder is covered with poplar, willow and scrub. Poplar scales as high as twelve inches and is spread all over the township. Some hay is found in different parts of the township. There are many sloughs in which the water is good. No alkaline water was found. There are no available water-powers although the river has a steady current throughout. The climate is good and all crops mature. I saw no summer frosts. Wood is the only fuel. I saw no quarries or minerals. A few ducks were the only game seen.—*Geo. McMillan, D.L.S., 1908.*

44. This township is traversed by the south branch of Saskatchewan river and can be reached by an excellent trail from Duck Lake settlement. There is a ferry crossing the Saskatchewan at St. Laurent, in Lot No. 5. The soil is fairly good although not much cultivated anywhere in the township. There is an abundance of poplar timber for fuel and other purposes. All the water is good. I saw no stone quarries or other minerals. No water-power or flooded lands were found. The surface is rolling and the drainage is natural. There were no summer frosts and the small crops matured well.—*Geo. McMillan D.L.S., 1908.*

*Range 2.*

6. The route for reaching this township is by a good trail running through Moosejaw to Wood mountain which lies from two to three miles west of this township. The soil consists of from six to twelve inches of dark sandy loam over a clay or sandy clay

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 2—Continued.*

subsoil and where not too rolling is well suited for mixed farming purposes. The surface is rolling or gently rolling prairie, but becomes very broken near the edge of Twelvemile lake, occasional small bluffs of poplar are to be found on the south side of the lake. Hay is rather scarce, but there are some small hay meadows especially in the north part of the township where small amounts of good hay can be cut. Water is plentiful and the supply permanent, being furnished by Twelvemile lake which averages about a mile wide, and extends through the centre of the township from east to west. This lake must be about twelve feet deep and the water is slightly brackish, but quite fit for use. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about eight miles south and lignite coal about five miles south of this township. No stone or minerals were found. Ducks are plentiful around the lake but there are no fish in it.—*R. H. Cautley, D.L.S., 1908.*

*Range 3*

6. A good trail from Mossejaw to Wood mountain runs through the centre of this township entering it in section 34 and leaving it in section 4. The soil consists of from six to twelve inches of dark sandy loam over a clay or sandy clay subsoil and the east half of the township is suited for mixed farming purposes but the west half of the township is mostly too rolling for farming purposes and is more suitable for ranching. The surface in the east half of the township is gently rolling or rolling prairie, but in the west half it is more steeply rolling in character. Small bluffs of maple and poplar scrub occur in some of the ravines in the southwest corner of the township. Hay is rather scarce but there are some small hay meadows especially in the north part of the township, where small amounts of good hay can be cut. Water is plentiful and the supply permanent being furnished by Twelvemile lake which averages about a mile in width and extends about three and one-half miles into the township from the east boundary. This lake must be twelve feet deep in places and the water is slightly brackish but quite fit for use. There are also two flowing creeks one, which is ten feet wide, one foot deep and has a current of one mile an hour, the water of which is quite fresh, flows into the south side of the lake and the other, which is twelve feet wide, eighteen inches deep and has a current of one mile an hour, flows westward out of the lake. Both creeks cease flowing in July but a permanent supply of water is retained in deep pools along their courses. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about eight miles south and lignite coal about five miles south of this township. No stone or minerals were found. Ducks are plentiful in the lake, but there are no fish in it.—*R. H. Cautley, D.L.S., 1908.*

7. The trail from Moosejaw to Wood mountain, which is a good trail, runs through the east end of this township, entering it in section 36, and leaving it in section 3. The soil consists of six to twelve inches of dark sandy loam over a clay or sandy clay subsoil and is well suited for mixed farming purposes. The surface is gently rolling and there is no bush of any description. Hay is very plentiful, there being numerous small hay meadows scattered all through the township, but it is of rather a poor quality. The supply of fresh water is plentiful and permanent, there being numerous large hay marshes with two to three feet of water in places, scattered through the township. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about fourteen miles south and lignite coal about twelve miles south of this township. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game and they are very scarce.—*R. H. Cautley, D.L.S., 1908.*



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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 3—Continued.*

8. The best route for reaching this township is by a good trail running from Moosejaw to Wood mountain through the township to the east, from where it is necessary to branch off across open prairie to this township. The old Wood mountain trail runs through the centre of this township, but is not used and is difficult to follow in places. The soil consists of from three to twelve inches of sandy loam over a clay or sandy clay subsoil, with stony patches in places, and is suitable for mixed farming purposes. The surface is undulating to gently rolling prairie and there is no bush of any description. Hay is fairly plentiful, there being numerous small hay meadows scattered all through the township, where hay of rather poor quality could be cut. Fresh water is fairly plentiful and the supply permanent, there being several wet hay marshes with two feet of water in places, scattered through the township, and in section 33, there is a fresh water lake with five to six feet of water in it. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty miles south and lignite coal about eighteen miles south of this township. No stone or minerals were found. Antelope and jack-rabbits are the only kind of game and they are very scarce.—*R. H. Cautley, D.L.S., 1908.*

9. The best route for reaching this township is by the old Wood mountain trail, which branches off from the present trail at the southeast corner of Johnston lake. This trail passes through the centre of this township entering it in section 34, and leaving it in section 5, it is well travelled and a good trail as far as Thomson's store in the southwest quarter of section 34. The soil consists of from four to twelve inches of dark sandy loam over a clay or sandy clay subsoil and is well suited for mixed farming purposes, especially in the north half of the township where there is some very good land. The surface is undulating or gently rolling prairie and there is no bush of any description. There are numerous small hay meadows scattered through the township where small amounts of hay of good quality can be cut. The supply of fresh water is very limited but there are parts of two lakes which extend into this township, one in section 4 and the other, which is a very small lake, in section 18; both of these lakes contain fresh water, but the settlers depend chiefly on well water, which is of very poor quality and limited in supply. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-six miles south and lignite coal about twenty-four miles south of this township. No stone or minerals were found. A few antelope and jack-rabbits were seen but are not very plentiful.—*R. H. Cautley, D.L.S., 1908.*

10. The best route for reaching this township is by the old Wood mountain trail which branches off from the present trail at the southeast corner of Johnston lake. This trail enters the township in section 24 and leaves it in section 3, and is a good level road. The soil varies a good deal in this township in places consisting of from four to twelve inches of sandy loam over a sandy clay subsoil and in others of a heavy clay or gumbo soil. It is all well suited for farming purposes. The surface is undulating prairie and there is no bush of any description. Hay is plentiful, there being several small hay meadows scattered all through the township, and in sections 10 and 11 there is a large hay meadow where at least two hundred tons of hay can be cut. The supply of fresh water is very limited there being no creeks or ponds in this township; nearly all the settlers were hauling water from a well in section 10 which was located in the centre of the hay meadow described above. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about thirty-two miles south and lignite coal



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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 3—Continued.*

about thirty miles south of this township. No stone or minerals were found and no game of any kind was seen.—*R. H. Cautley, D.L.S., 1908.*

24. There is a good trail leading from this township along the north boundary of township 24, range 4 to Elbow, a station on the Moosejaw to Outlook branch of the Canadian Pacific railway about eight miles northwest of this township. There are three elevators, a bank, hotel, livery stables and stores of all kinds at the above mentioned settlement. The soil in this township is very light, in fact three-quarters of it is composed of sand hills and the remainder, the most northerly tier of sections are of a light sandy loam. This is all settled and under cultivation. Although the weather of the past season was not very propitious yet fairly good crops were realized. On one section where they had had two hundred acres of wheat, thirty-four hundred bushels were harvested, realizing nearly twenty-seven hundred dollars and a haul of only nine miles to the elevators at Elbow. The northern part is undulating open prairie but the balance is rolling sand hills covered for the most part with willow scrub and some small poplar, much of the latter being firekilled. There are some fair hay marshes and meadows in the sand hills, also good pasture in places. The water found in ponds and marshes is generally alkaline, but fairly good water has been obtained by settlers by digging wells. There are no water-powers. No summer frosts of any account prevail. Firekilled poplar and willow are available for fuel in the sand hills, but coal may be procured at the nearest railway station. Neither stone quarries nor minerals were observed. Game is becoming very scarce; there are, however, a few duck and an antelope is now and again sighted in the sand hills. This township is also easily reached by good trails from Davidson and Girvin on the Canadian Northern railway. These towns find the burnt and fire-killed poplar in the sand hills the only fuel obtainable at certain seasons of the year.—*C. F. Miles, D.L.S., 1908.*

52. This township is reached from Prince Albert by following the Montreal lake surveyed trail as far as Sturgeon lake, then branching off on a trail passing through the Sturgeon Lake Indian reserve and running northwesterly as far as the lumber camps in Stump lake vicinity. It crosses this township diagonally, following the south bank of Sturgeon river. In wet seasons the trail is almost impassable west of the Indian reserve. The soil is a black loam with clay or sandy clay subsoil. This township was burned over some years ago and is now covered with standing and fallen dead poplar, green spruce, second growth poplar and brush. Hay sloughs are numerous, Sturgeon river runs diagonally across this township. Normally it is about seventy-five feet wide and four feet deep, flowing three miles per hour, but during part of June and July it flooded over its entire valley to a depth of from two to four feet. No practical power-sites were observed. Numerous small streams and lakes abound, all the water being very good. June frosts were observed and during the time of survey (June) it rained almost incessantly. Wood for fuel is plentiful. No coal or minerals were found, or stone of any value. The township appears too wet for agricultural purposes but Sturgeon valley is suitable for grazing. Moose, deer, and bear are plentiful.—*F. H. Kitto, D.L.S., 1908.*

*Range 4.*

5. The best route for reaching this township is by means of a good trail running from Moosejaw to Wood mountain which lies from two to three miles east of this township. The soil consists of from five to six inches of sandy loam over a clay or sandy clay subsoil, and grows good grass for grazing purposes, but the land is too rolling for cultivation in most places, and is more suitable for horse ranching purposes. The surface is rolling prairie and there is no bush of any description. Hay is rather

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 4—Continued.*

scarce but there are a few small hay meadows scattered through the township where a limited amount could be cut. Water is also rather scarce but there are several small creek beds within the township which, although they have no flowing water, retain a limited supply of water all summer in deep pools along their courses. No water-power can be developed in this township. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained five or six miles south of this township, and lignite coal can be obtained in the township east of it. No stone or minerals were found. Antelope and jack-rabbits are to be found in this township but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

6. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain, which lies about three miles east of this township. The soil consists of from four to eight inches of sandy loam over a clay or sandy clay subsoil. The west half of this township is suitable for mixed farming purposes, but the east half, which is very broken, is more suitable for ranching. The surface is rolling or gently rolling prairie, broken by deep ravines in the easterly half of the township, and there is no bush of any description to be found. There are no hay meadows, but small amounts of upland hay could be cut all through the township. Water is not very plentiful, but there are two creeks in this township, one in the east half of the township being twelve feet wide, eighteen inches deep and with a current of one mile an hour, of which the water is very slightly brackish, and which ceases flowing in July, but considerable water is retained in deep pools along its course; the other is ten feet wide and has no flowing water, but there are deep pools of fresh water all along its course. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about ten miles south, and lignite coal about eight miles southeast of this township. No stone or minerals were found. Antelope and jack-rabbits were seen in this township, but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

7. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain which lies from five to six miles east of this township. The soil consists of three to ten inches of sandy loam over a clay or sandy clay subsoil with stray patches in places and is suitable for mixed farming purposes. The surface varies from undulating to rolling prairie and there is no bush of any description. There are no hay-meadows and hay is very scarce. Water is also rather scarce but there is a good sized creek which flows through the centre of the township entering it in section 2 and leaving it in section 31. This creek in June was twelve feet wide, eighteen inches deep with a current of one mile an hour; at the end of July it had ceased flowing, but there were deep pools of slightly brackish water all along its course. There is another small creek in the north end of the township which flows into the above mentioned creek in section 32 and has pools of fresh water along its course. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about sixteen miles south and lignite coal about fourteen miles south of this township. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

8. The best route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 8, range 2, from where it is necessary to branch off across open prairie to this township. There is another trail which runs from section 30 of this township to Gravelbourg, and this is the route used by the settlers, but it is farther from Moosejaw by this trail. The soil consists of from six to twelve inches of sandy loam over clay or sandy clay subsoil and is well suited for mixed farming purposes, especially adjoining the west boundary where the land is very

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 4—Continued.*

good. Hay is not very plentiful, but in sections 19 and 30 there is part of a large hay meadow which extends into the next township where fifty or sixty tons of good hay could be cut. Fresh water is very scarce, as there are no ponds or creeks with any water in them, but there is a good well in section 30. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-two miles south and lignite coal about twenty miles south of this township. No stone or minerals were found. Antelope and jack-rabbits are the only kind of game but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

9. The best route for reaching this township is by means of the old Wood mountain trail which runs through township 9, range 3, from where it is necessary to branch off across country to this township. The soil consists largely of heavy clay or clay loam, and owing to the rolling nature of the country it is not very suitable for farming purposes but would make good ranching country in the spring and early summer, as there is good grass in this township, but water is very scarce in autumn. The surface is rolling prairie and there is no bush of any description. Hay is fairly plentiful, there being numerous small hay meadows scattered all through the township, where hay of rather poor quality could be cut. Water is very scarce, the only permanent supply being a small fresh water lake on the east boundary of section 13; in the early summer there would be plenty of water, as several small hay marshes had very soft bottoms and had only just dried up in August. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-eight miles south, and lignite coal about twenty-six miles south of this township. No stone or minerals were found. Several bands of antelope were seen in this township and also some jack-rabbits, but there is no other kind of game.—*R. H. Cautley, D.L.S., 1908.*

23. The Moosejaw to Outlook branch of the Canadian Pacific railway runs diagonally through this township, entering at section 12 and leaving in section 32, so this township will be easy of access from either north or southeast. There is an elevator at Bridgeford in section 7 of the adjoining township east and there are several elevators, stores, boarding houses and livery stables in Tugaske which is located about eight miles southeast of the township. The soil in the southerly two-thirds of this township is sandy loam with a subsoil of sand, whereas the northerly third is almost entirely of sand. Part of the two northerly tiers of sections is composed of sand hills covered with low scrub. All the available homesteads in the southerly tiers are taken up, also some of the odd sections, and the soil in this part is suitable for the raising of all kinds of cereals. The greater portion of the township consists of open undulating prairie. The northerly and northeasterly portion, however, is hilly and in some places covered with willow, but there is no timber to be found of any account. There are but few hay meadows, most of the hay being cut on the uplands. The water in the pools and marshes is mostly alkaline but wells dug by settlers contain fairly good fresh water. Qu'Appelle river rises in this township in a lake situated in the northeast corner of section 26, from here the water runs both southeasterly down the Qu'Appelle valley and northwesterly under the name of Aiktow creek into Saskatchewan river. There are no available water-powers. I understand that there are no summer frosts and the crops at the time of the survey, in June, looked very promising. There is no fuel and much of the wood hitherto used as fuel has been obtained from the sand hills to the northeast of this township, but from all appearances, at the rate the timber is being cut, it will not hold out another winter. Coal will, no doubt, be obtainable at all the stations on the new line as soon as the steel is laid. There are no stone quarries of any description and no minerals. There are still a few prairie

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 4—Continued.*

chickens to be seen and occasionally an antelope, but all game will soon be exterminated. This township is about as well settled as it is likely to be as most of the odd sections that are of any value have been pre-empted by the settlers.—*C. F. Miles, D.L.S., 1908.*

24. This township is reached by a good trail from Elbow, a station on the Moosejaw to Outlook branch of the Canadian Pacific railway, which passes through the west half of the township. Owing to the lateness of the season, the pits were not dug but the soil appears to be light all through the central portion. A continuation of the sand hills along the banks of the Qu'Appelle valley covers the southern part of the township, which with a good growth of willow, scrub and some second growth poplar make this part of the township of little value, except for grazing purposes. Except the sand hills it is mostly undulating and light rolling prairie. There are some hay marshes but the bulk seems to be cut in the upland and in the Aiktow valley in dry seasons. Summer frosts on the light soils appear to be not so general as they are on heavier soils. Fuel may be had in the sand hills where there is still some firekilled poplar, but now that the railway is so convenient, no doubt, coal will be more generally used. There were no stone quarries nor any minerals observed. Game is getting very scarce, this and the adjoining townships being too thickly settled. Only two years ago, antelopes and deer were quite plentiful but only an occasional one is now seen. There are still a few prairie-chickens to be met with and coyotes are quite a common sight in the hills. The building of the new railroad has given a great impetus to the settlement of this district. A number of small towns have sprung up. Elbow, being the closest of any size to this township, is used by settlers in this vicinity as a supply and shipping point. This settlement contains banks, hotel, elevators, postoffice and all kinds of stores. Aiktow station is in section 5 of this township and could be used as a shipping point but will not amount to anything, on account of its location in the sand hills.—*C. F. Miles, D.L.S., 1908.*

52. This township is reached from Prince Albert by a trail which crosses the northern part of the township, leading to the lumber camps in the vicinity. It is almost impassable except when frozen. The township is covered with heavy spruce, poplar, tamarack and birch, with thick underbrush in places. The best spruce is being cut out. The surface is fairly level but badly broken by a chain of lakes extending diagonally across the township from the northwest to the southeast, by Sturgeon river crossing the northeast corner and by numerous small lakes, muskegs and large sloughs. The soil is a black loam with clay subsoil. No hay is to be found. The water of the lakes and rivers is good. Wood for fuel or building is plentiful but no coal, stone or minerals were found. June frosts were observed. The township appears too wet and swampy to be suitable for settlement or grazing. Fish are plentiful in the lakes; moose, deer and bear were seen.—*F. H. Kitto, D.L.S., 1908.*

*Range 5.*

5. The best route for reaching this township is by means of a good trail running from Moosejaw to Wood mountain through township 5, range 3, from where it is necessary to branch off through rolling prairie to this township. The soil consists of from four to eight inches of sandy loam over a sandy clay subsoil and, where not too rolling, is suitable for mixed farming purposes. The surface is rolling or gently rolling prairie and there is no bush of any description. Hay is rather scarce as there are no hay meadows, but small amounts of upland hay could be cut all through the township. Water is fairly plentiful and the supply is permanent, being furnished by one flowing creek in the west part of this township, which is five feet wide, six inches deep and

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 5—Continued.*

has a current of one mile an hour; this creek does not flow all summer, but there are permanent pools of fresh water all along its course. There are also small creek beds with no flowing water but with occasional permanent pools of fresh water along their courses, all through the township. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained in the hills about eight miles south, but there are no coal veins in this township. No stone or minerals are to be found. Antelope and jack-rabbits are the only kinds of game in this neighbourhood.—*R. H. Cautley, D.L.S., 1908.*

6. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 6, range 3, from where it is necessary to branch off through rolling prairie to this township. The soil consists of from six to twelve inches of light sandy loam over a clay or sandy clay subsoil, and is suitable for mixed farming purposes. The surface is undulating or gently rolling prairie and there is no bush of any description. There are no hay meadows, but small amounts of upland hay could be cut all over the township. Water is rather scarce; there are two creeks in the township neither of which has any flowing water, but both retain a limited supply of fresh water all summer in deep pools along their beds. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about fourteen miles south, but there are no coal veins in this township. No stone or minerals were found. Antelope and jack-rabbits were seen, but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

7. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 7, range 3, from where it is necessary to branch off across open prairie to this township. The soil consists of from three to six inches of sandy loam over a sandy clay subsoil mostly, and is suitable for mixed farming purposes, but in the northwest quarter of the township the soil is a heavy clay and should make good wheat land. The surface is generally undulating prairie but there is a good stretch of nearly level prairie adjoining Wood river in the northwest quarter of the township, and there is no bush of any description. There are no hay meadows but small amounts of upland hay could be cut in places. Water is plentiful and the supply permanent, being furnished by Wood river which is twelve feet wide, eighteen inches deep, with a current of two miles an hour and contains fresh water, also two other creeks, one twelve feet wide, eighteen inches deep and with slightly brackish water, the other ten feet wide and with fresh water, both these creeks had stopped running in July, but retained a permanent supply of water in deep pools all along their courses. Wood river also ceases flowing in the autumn, but large and deep pools of water remain all along its course. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty miles south of this township, but there are no coal veins in the vicinity. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game, but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

8. The best route for reaching this township is by a fairly good trail which runs from Gravelbourg into the northeast corner. The soil consists generally of from six to twelve inches of sandy loam over a clay or sandy clay subsoil, and is well suited for mixed farming purposes, and, adjoining Wood river in the west part of the township, there is some heavy clay soil which would make good wheat land. The surface is undulating or gently rolling prairie and there is no bush of any description. There is a large hay meadow in sections 23, 24, 25 and 26, where nearly a thousand tons of good hay could be cut. The supply of fresh water is fairly

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 5—Continued.*

plentiful and permanent, being furnished by Wood river, which is twenty-five feet wide, two feet deep and has a current of one mile an hour. This stream ceases flowing in the autumn, but there are large and deep pools all along its course which retain a permanent supply of water. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-six miles south of this township, but there are no coal veins in this vicinity. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game, but are very scarce.—*R. H. Cautley, D.L.S., 1908.*

9. The best route for reaching this township is by means of a trail running from Gravelbourg to township 8, range 5, which passes through this township entering it in section 36 and leaving it in section 2. The soil consists of from three to six inches of dark sandy loam, over a clay or sandy clay subsoil and it is well suited for mixed farming purposes, especially in the west two miles of the township, where there is some very good land. The surface is undulating or rolling prairie with a few small clumps of willow and maple scrub along the banks of Wood river. There are several small hay meadows in the east end of the township where a considerable amount of good hay can be cut, and in sections 18 and 19 there is part of a large hay meadow which extends over into the next township where probably forty to fifty tons of good hay can be cut. The supply of fresh water is plentiful and permanent, being furnished by Wood river which enters this township in section 6 and leaves it in section 36. It is twenty-five feet wide and two feet deep. The river had stopped flowing by August 7, but a permanent supply of fresh water was retained in deep and large pools all along its course. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained in very small quantities along the river banks, but for good wood it is necessary to go about thirty-two miles south of this township. There are no coal veins in this vicinity. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game, but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

*Range 6.*

5. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 5, range 3, from where it is necessary to branch off through rolling prairie to this township. The soil consists of from three to twelve inches of sandy loam over a sandy clay subsoil, and is suitable for mixed farming. The surface is undulating or gently rolling prairie in the north half of the township, but is more rolling farther south, and there is no bush of any description. Hay is rather scarce as there are no hay meadows, but small amounts of upland hay could be cut all through the township. Water is fairly plentiful and the supply is permanent being furnished by Wood river in the northwest and a flowing creek in the northeast of this township. Wood river is twelve feet wide eighteen inches deep, with a current of two miles an hour, and the creek in the northeast corner of the township is five feet wide six inches deep and has a current of one mile an hour; both these streams cease flowing in the fall of the year but a permanent supply of fresh water is retained in deep pools along their courses. There are also other small creek beds with no flowing water but with occasional permanent pools of fresh water along their courses. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained in the hills about ten miles south of this township, but there are no coal veins in this township. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game in this neighbourhood.—*R. H. Cautley, D.L.S., 1908.*



## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 6—Continued.*

6. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 6, range 3, from where it is necessary to branch off through rolling prairie to this township. The soil consists of from six to twelve inches of sandy loam over a clay or sandy clay subsoil and this township, especially the western half, is well suited for mixed farming. The westerly half is undulating prairie but the easterly half is more rolling; there is no bush of any description. Hay is rather scarce, but small amounts of upland hay could be cut all through the township. Fresh water is plentiful and the supply permanent being furnished by Wood river and creek which flows into Wood river in section 33. Wood river is twelve feet wide, eighteen inches deep with a current of two miles an hour, and the other creek is five feet wide, six inches deep, with a current of one mile an hour. Both these streams cease flowing in the autumn but a permanent supply of water is retained in deep pools along their courses. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about sixteen miles south but there are no coal veins in this township. No stone or minerals were found. Antelope and jack-rabbits were seen but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

7. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 7, range 3, from where it is necessary to branch off across open prairie to this township. The soil in the greater part of this township consists of a gray chalky clay which does not look very productive, but there is some good land adjoining the south and west boundaries with a sandy loam soil over a sandy clay subsoil which would be suitable for mixed farming purposes. The surface is level to undulating prairie and there is no bush of any description. There are no hay meadows and very little upland hay could be cut. The supply of fresh water is fairly plentiful and permanent, being furnished by Wood river which is twelve feet wide, eighteen inches deep, and has a current of two miles an hour. This stream ceases flowing in the autumn, but a permanent supply of water is retained in large and deep pools along its course. No water-power can be developed. The climate is similar to that of Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-two miles south of this township, but there are no coal veins in this vicinity. No stone or minerals were found. A few sage grouse were seen, but there are no other kinds of game.—*R. H. Cautley, D.L.S., 1908.*

8. The best route for reaching this township is by a trail which runs from Gravelbourg on the west side of Wood river, this trail is fairly good and well defined as far as section 30 in township 9, range 5, from where it branches off in all directions, but the prairie is not hilly and is very easy to travel over. The soil consists of from six to twelve inches of sandy loam over a clay subsoil and is well suited for mixed farming purposes. The surface is undulating or gently rolling prairie and there is no bush of any description. Hay is not plentiful, but there are a few small hay meadows scattered through the township where small amounts of hay of rather poor quality could be cut. The supply of fresh water is fairly plentiful and permanent, being furnished by Pinto creek which flows into Wood river in section 24, and also by Wood river, which passes through sections 24, 25 and 36. Pinto creek was quite dry in places in July, but there are deep and large pools at intervals all along its course, some being as large as one chain wide and five feet deep. Wood river is twenty-five feet wide, two feet deep and has a current of one mile an hour. This stream stops flowing in the autumn, but retains a permanent supply of water in deep pools along its course. No water-power can be developed. The climate is similar to



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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 6—Continued.*

that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about twenty-eight miles south of this township, but there are no coal veins in this vicinity. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game, but they are scarce.—*R. H. Cautley, D.L.S., 1908.*

9. The best route for reaching this township is by means of a trail which runs from Gravelbourg to section 25 of this township; it is not a very good trail as it has not been travelled very much, but it runs through fairly level country all the way; from section 25 there are tracks running to the different settlers' homes but none of importance. The soil consists of from four to eight inches of dark sandy loam over a clay subsoil and is well suited for mixed farming purposes. The surface is undulating prairie and there is no bush of any description. There is a large hay meadow in sections 14 and 24 which is wet and marshy in the centre and on which over a hundred tons of good hay could be cut, but there is very little hay in other parts of the township. Water is very scarce, there being no creeks or ponds and the settlers were getting their water from a good well in section 15. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained about thirty-four miles south of this township, but there are no coal veins in this vicinity. No stone or minerals were found. Antelope and jack-rabbits are the only kinds of game, but are very scarce.—*R. H. Cautley, D.L.S., 1908.*

10. The best route for reaching this township is by means of a trail which runs from Gravelbourg and follows along the correction line to the home of a settler in section 36 of this township. The trail is rather rough not having been travelled much but runs through very level country. The soil consists of from six to twelve inches of sandy loam over a clay or sandy clay subsoil and owing to the rolling nature of the country this township is more adapted to ranching purposes than farming but there are a few sections that would be suitable for mixed farming purposes. The surface is rolling or gently rolling prairie, and there is no bush of any description. Hay is fairly plentiful, there being several good sized hay meadows scattered all through the township, where hay of rather poor quality can be cut, the largest of these hay meadows in section 19 would probably furnish forty tons of hay. Water is very scarce in this township there being no ponds or creeks in it, but several of the hay meadows have some fresh water in them. No water-power can be developed. The climate is similar to that of the Moosejaw district, and summer frosts are rare. Wood for fuel can be obtained about forty miles south of this township, but there are no coal veins in this vicinity. No stone or minerals were found. Several small herds of antelope were seen and some jack-rabbits but there are no other kinds of game.—*R. H. Cautley, D.L.S., 1908*

*Range 7.*

5. The best route for reaching this township is by a good trail running from Moosejaw to Wood mountain through township 5, range 3, from where it is necessary to branch off through rolling prairie to this township. The soil consists of from six to eighteen inches of dark sandy loam over a sandy clay subsoil and is well suited for mixed farming purposes. The surface is undulating prairie and no bush of any description is to be found. Hay is rather scarce as there are no hay meadows, but small amounts of upland hay could be cut all through the township. Water is fairly plentiful and the supply is permanent being furnished by Wood river which is twelve feet wide eighteen inches deep and has a current of two miles an hour. This stream stops flowing in the fall of the year but a permanent supply of fresh water is retained

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*Range 7—Continued.*

in deep pools along its course. There are also two other fair sized creek beds with no flowing water but with permanent pools along their courses. No water-power can be developed. The climate is similar to that of the Moosejaw district and summer frosts are rare. Wood for fuel can be obtained in the hills, ten to fifteen miles south of this township, but there are no coal veins in the vicinity. No stone or minerals were found. Antelope and jack-rabbits were seen but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

6. The route for reaching this township is by a good trail running from Moosejaw to Wood mountain, through township 6, range 3, from where it is necessary to branch off across country to this township. The soil consists of from six to eighteen inches of sandy loam over sandy clay subsoil and is well suited for mixed farming purposes. The surface is undulating or gently rolling prairie, and there is no bush of any description. There are no hay meadows but small amounts of upland hay could be cut all through the township. Water is very scarce, the only source of supply being a small creek in the extreme south of this township; it has very little running water, but has deep pools of fresh water all along its course. No water-power can be developed. The climate is similar to that of the Moosejaw district, and summer frosts are rare. Wood for fuel can be obtained about eighteen miles south but there are no coal veins in this vicinity. No stone or minerals were found. Antelope and jack-rabbits were seen but are not plentiful.—*R. H. Cautley, D.L.S., 1908.*

7. The soil in the northwest portion of this township is usually a brown loam and clay subsoil, but in the southeast part it is quite sandy in places along a ridge near the east side. It would make fair farm land, and is very good for grazing. The surface of the northwest part is gently rolling bare prairie, while that of the southeasterly portion is more rolling with a few sand hills towards the east. There is no timber and very little hay. There is no water in this township and no water-powers. The land is not liable to be flooded. The climate was hot with some heavy rain and very high winds; no summer frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil across the centre of this township from sections 7 and 18 to sections 24 and 25 is mostly a heavy clay in the Pinto creek flat. It was a shallow lake bottom at one time, but is now dry and rough. North and south of this the soil is a sandy loam with clay subsoil, and this part of it would make good farm land. The flat has considerable hay on it and makes fair grazing land. The surface is flat across the centre but bare rolling prairie to the north and south. There is no timber and hay is not very plentiful. Water is scarce but alkaline pools are still found in the Pinto creek bed; some squatters towards the north side of the township have wells with good water. The flat may be flooded in the spring but not likely over a foot deep. There are no water-powers. The climate was warm, and no frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope. Until the end of June rain fell fairly frequently and there was usually heavy dew. This kept the grass green all over the prairie, but in July, rains were less frequent and scorching hot dry winds were almost continuous for some days so that the grass soon becomes brown and dry.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil of this township is a brown clay loam with a few stony places, but would make good farm land if there was plenty of rain. The surface is all bare rolling prairie, but towards the southeast it is fairly level and would make fine farm land. There is no timber and very little hay. A little might be cut in some of the sloughs here and there throughout the township. The water is usually fresh but there are

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 7—Continued.*

some places with white alkali. There is plenty of water in the spring but it would be very scarce in the summer. There are on streams nor water-power and the land is not liable to be flooded. The climate was cool and quite a lot of rain fell. Some hard frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope and duck.—*W. G. McFarlane, D.L.S., 1908.*

10. The route followed was from Moosejaw to Johnston lake, thence westerly by trail to township 10, range 6. The trail then followed the correction line west to township 10, range 7, and is all good. The soil is a brown clay loam and would make very good farm land if there was plenty of rainfall. The surface is all bare prairie, but there are some gravelly and stony ridges. The land is gently rolling with a ridge running across the southern half just south of the south chord. There is no timber. A few hay sloughs are found in sections 20, 21 and 29 but are not of much account as it is coarse slough hay. The water is generally fresh. There are many small fresh-water sloughs and a few fair sized fresh water lakes which dry up. One large slough in section 16 has alkaline water and is surrounded by reeds. It would probably dry up in some dry seasons. The supply was sufficient at the time of survey (May), but it would be all gone in a few months. There are no streams nor water-powers and the land is not liable to be flooded to any great extent. The climate was cool, except during a few days, and considerable rain fell. A few hard frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope and duck.—*W. G. McFarlane, D.L.S., 1908.*

*Range 8.*

5. The soil is a brown loam and clay subsoil in general, but there are quite a lot of stones throughout the greater part of the township, as well as several scattered alkaline flats. It would make fair farm land but is better for grazing. The surface is all bare prairie, gently rolling on the west half, and the north side except at the north-west corner which is a little hilly. The east part of the township is more hilly, although not very abrupt. There is no timber and very little hay, but the grass was fairly good. Water is fairly plentiful in McDonald creek which crosses the north side of the township, but has stopped running now (July). The water in the pools is fairly good, but a little alkaline. There is a large shallow slough on the east boundary of section 3. The land is not liable to be flooded, and water will be rather scarce later in the season. There are no water-powers. The weather was very hot, with some thunderstorms, and scorching hot winds. No frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope. A good trail runs westerly to Wood mountain across the township near the north chord.—*W. G. McFarlane, D.L.S., 1908.*

6. The soil is a brown loam with clay subsoil. Considerable scattered stone is found, but this would not hurt it for farm land very much. It would make either good farm land or grazing land and it seems to have a better growth of grass than the rest of the township to the north of it. The surface is mostly gently rolling bare prairie, but the southeast quarter of the township as well as a few sections at the south end of the west boundary are somewhat hilly. There is no timber and very little hay. Water is rather scarce and somewhat alkaline. McDonald creek crosses the southeast corner, but it is drying up and has scarcely any current now. A little water was found in a coulée at the north side of the township. It was fairly fresh, but would soon all be dried up. Water will be very scarce in the fall. The land is not liable to be flooded, and there are no water-powers. The weather was warm, with some rain and high winds. No frosts were noticed. There is no fuel, stone quarries

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 8—Continued.*

or minerals in the township, and the only game seen was antelope. Hot winds have a very bad effect as they soon dry all the water up and scorch the grass too early in the summer.—*W. G. McFarlane, D.L.S., 1908.*

7. The soil is in general a brown loam with clay subsoil and would make fair farming or grazing land. The surface of the easterly part is very slightly rolling, while that to the west with the exception of a portion along the south of Pinto creek is rolling, but near the creek it is rather hilly. It is all bare prairie with no timber and no hay. Water is very scarce except in Pinto creek, which runs across the northwest corner of the township; it is rather alkaline and has almost stopped running. The land is not liable to be flooded and there are no water-powers. The climate was warm and dry with high winds. No frosts were noticed. There is no fuel, stone quarries or minerals and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil in the southeast quarter of this township is a heavy clay and would not make very good farm land, but makes fair grazing land. The other parts of the township have a brown loam and clay subsoil with some stones in the northeast quarter, and some alkaline clay flats in the west half. Much of it would be good farm or grazing land. The surface is all bare prairie. The southeast quarter is mostly a river flat with some alkali and a strip runs up through sections 20 and 19. The west half is mostly rolling with a few alkaline flats, while the northeast quarter is rather hilly and stony. There is no timber and very little hay. The water is rather alkaline and is very scarce, except in Pinto creek, but even this is getting low. However, there will likely be water in the pools most of the summer. The river flat might be flooded in early spring but not to any great depth. There are no water-powers. The climate was warm and dry with high winds, and no frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil is a brown clay loam and would be fairly good for farm land. The surface is all gently rolling bare prairie. There is no timber and very little hay. The water is fresh and is rather plentiful in small sloughs in the spring but would all dry up during the summer. There are no streams and the land is not liable to be flooded. There are no water-powers. The climate was usually cool, but some hot days were experienced and considerable rain fell. Some hard frosts were noticed. There is no fuel, stone quarries or minerals and the only game found was antelope.—*W. G. McFarlane, D.L.S., 1908.*

10. The soil is a brown clay loam with considerable gravel and stones on some ridges towards the south. The surface is all bare prairie, fairly level towards the north, but rolling and hilly towards the southwest. There is no timber and very little hay. A large slough, nearly dry, runs into the northwest corner and it might have some coarse hay. The water is fresh but is rather scarce and will have all disappeared before the season is over. There are no streams and the land is not liable to be flooded. There are no water-powers. The climate is usually cool and considerable rain fell. Some hard frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope. All this part of the prairie is good grazing land and would also make fair farm land.—*W. G. McFarlane, D.L.S., 1908.*

*Range 9.*

7. The soil of this township is usually a brown loam with clay subsoil, but from the centre of the township north, the surface is flat, and the soil is heavy clay in sections 27, 28 33 and 34. It would make good farm land if it had plenty of rain, and is

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 9—Continued.*

now good for grazing. The surface is gently rolling around the boundary line and the south third of the township, and slopes off to a flat at the centre of the north side. It is all bare prairie. There is no timber and no hay. The water is fairly good, but a little alkaline. Pinto creek runs across the north side of the township and a tributary creek comes in through sections 18, 17, 16, 22 and 27. Pinto creek is barely running and will soon be only a series of pools. There are no water-powers and the land is not liable to be flooded. The weather was usually warm and dry with high winds. No frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil is chiefly a brown loam and a clay subsoil, but some flats of rather hard clay are found in the northeast quarter of the township. The surface is all bare rolling prairie with the highest elevation running easterly across the centre of the township. A valley runs easterly across the north part of the township. There is no timber and very little hay. Water is very scarce, but there is a little in the valley to the north. It is fairly fresh, but there are some alkaline flats. Pinto creek touches the southwest corner and the water might flow easterly along the valley to the north and flood part of the flats but not to any great depth. There are no water-powers. The weather was warm and dry with high winds. No frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil is light sandy clay loam, and would be fairly good farm land if there was plenty of rainfall. The surface is bare, gently rolling prairie to the north and bare rolling prairie to the south. There is no timber. A little hay is found at the north boundary, but it is not plentiful. The water is usually fresh, but there are some alkaline streaks in the hollows towards the south. Water is scarce and it will soon be all gone. There are no streams and the land is not liable to be flooded. There are no water-powers. The climate was usually warm, with occasional rainfalls. No frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

10. The soil in this township is a brown clay loam and clay subsoil and would make fair farm land. The surface is bare prairie, gently rolling towards the north and west, and rather hilly towards the southeast. There is no timber and very little hay; a little might be cut on the sloughs in the southeast corner; but it would not amount to much. The water is fresh, but rather scarce. Some small sloughs are found towards the south and east, but they will soon dry up. There are no streams and the land is not liable to be flooded. There are no water-powers. The climate was usually warm and some rain fell. No frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

*Range 10.*

5. (East outline.) The soil is a light clay or slightly sandy with clay subsoil, and would make good farming land. The surface is rolling bare prairie, slightly hilly at the south side. There is no timber. Some hay meadows were seen, but it was only slough hay. A small permanent creek containing very good water, running east crosses about one mile from the base line. There is no danger from floods and no water-power is available. There is no fuel, stone quarries or minerals. The climate was warm and dry. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 10—Continued.*

6. (East outline.) The soil is a clay loam with clay subsoil, and would make very fair farm land. The surface is gently rolling, bare prairie, with no timber and but little hay. No water was found and the land is not liable to be flooded. There is no water-power, fuel, stone quarries or minerals. The climate was warm and dry. Antelope was the only game seen.—*W. G. McFarlane, D.L.S., 1908.*

7. The soil is usually a brown loam with clay subsoil, and would make good farming or grazing land. The surface is bare rolling prairie in general, but is rather billy at the centre and southeast of the township. The hills are somewhat stony, but not very abrupt or high. There is no timber and very little hay. The water is fairly good in Pinto creek, which runs easterly across the north end of the township, and in a small creek crossing the southeast corner. There is plenty just now (June) but it will be scarce later in the summer. Pinto creek is from two to fifteen feet wide and one to four feet deep, but has very little current. A creek at the southeast corner is scarcely more than a series of pools now. There is some alkali. The land is not liable to be flooded. There are no water-powers. The climate was warm with a little rain and a hurricane or two, but no frosts. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil is chiefly a brown loam with a clay subsoil and would make very good farm or grazing land. Some alkali is found in small flats and small creek bottoms. The surface is all bare, rolling prairie. Along the south side, several small coulees run down to Pinto creek and break the surface up somewhat. Some of these are rather gravelly and stony on the banks. There is no timber and very little hay. The water is not very plentiful and is very alkaline in the bed of a small stream which runs into Pinto creek, but is drying up and is now (June) only a series of pools at the south side of the township. It is rather better in Pinto creek at the south boundary of section 3. Pinto creek is from two to twenty feet wide and from one to five feet deep with but little current and will likely soon stop running. The land is not liable to be flooded and there are no water-powers. The climate was warm and high winds were frequent. We had a little rain but no frosts. There is no fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil of this township is a clay loam with clay subsoil and would make fairly good farm land. The surface is bare rolling prairie. There is no timber and no hay. The water is a little alkaline and rather scarce but some is found in creek beds in pools. There are no streams and the land is not liable to be flooded. There are no water-powers. The climate was warm and there was some rain but no frosts. There is no fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D. L. S., 1908.*

10. The soil of this township is mostly a good clay loam and would make good farm land. The surface is usually gently rolling bare prairie, but is broken on the west side by Notukeu creek which enters in section 18, and runs north along the west meridian. There is no timber and no hay. The water is a little alkaline in small sloughs in creek beds and in the large creek. It will all dry up except the large creek in the summer and even it is said to stop running but to hold water in the deep pools. It is about a chain wide and from one to five feet deep with a current of about one mile per hour. The land is not liable to be flooded. There are no water-powers. The climate was warm and we had some rain but no frosts. There is no fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 11.*

5. (East outline). The soil is light clay or sandy loam with clay subsoil and is good farming land. It is gently rolling prairie with no timber. A few hay sloughs were seen. Fresh water was found in sloughs and in a small creek running west two and one-quarter miles from the base line. There is no water-power, fuel, stone quarries or minerals, and the only game seen was antelope. It is also good grazing land.—*W. G. McFarlane, D.L.S., 1908.*

6. (East outline). The soil is a light clay or sandy loam with clay subsoil and is good farming land. The surface is bare rolling prairie with some small ridges which are a little stony. There is no timber and very little hay. Water is rather scarce and the supply very limited. "At three-quarters of a mile north, on the east boundary of section 25, a small creek of fresh water crosses, running east. It is liable to dry up in the fall. The land is not liable to be flooded. The climate was warm and dry. No fuel, stone quarries or minerals were found, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

7. The soil is usually a brown loam with clay subsoil, but considerable gravel is found along the banks of the coulées and heavy clay along the flats. The upland would make very good farm or grazing land. The surface is bare rolling prairie, but is pretty badly broken up in places by coulées. Pinto creek runs from the southwest corner to the northeast, and side coulées running into the main coulée are very numerous on the north side. Some of them have pools of water in them. There is no timber or hay. The water is quite alkaline, but is fairly plentiful at present (June.) It is found in Pinto creek and in pools in the side coulées. There are two streams forming Pinto creek, one from the west and one from the south, joining in section 8. Pinto creek is small and scarcely running and will be nothing but a series of pools in a short time. The land is not liable to be flooded. There are no water-powers. The climate was warm with some heavy rain and high winds, but no frost. There is no fuel, stone quarries or minerals and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil is chiefly a brown loam with clay subsoil and would make very good farm land if there was sufficient rainfall. It is very good for grazing. It is rather stony in the southwest corner. The surface is mostly gently rolling, bare prairie, but is rather broken along the south side by a coulée running south and east towards Pinto creek. One coulée comes in on the west boundary of section 7 and goes out on the south of 3, running nearly straight across. It varies from forty to one hundred feet in depth. Section 1 is badly broken by coulées. There is no timber or hay and very little water, but some is found in the large coulée and it is fairly fresh. The supply is very limited and not permanent. There are no streams and the land is not likely to be flooded. There are no water-powers. The climate was warm with some rain and high winds, but no frost. There is no fuel, stone quarries or minerals and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil is chiefly a brown loam with clay subsoil, but is a little gravelly and stony in places along the coulée by Notukeu creek. It would make good farm land. The surface is all bare prairie and is gently rolling, except in the northwest quarter of the township. Notukeu creek comes in from the west at the north boundary of section 19, and runs easterly about three miles, then north, and breaks this corner up somewhat with fairly deep coulées. There is no timber and no hay. The water is scarce, except in the creek which is about two feet deep, one chain wide and has a current of about one mile per hour. The land is not liable to be flooded. There are



## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 11—Continued.*

no water-powers. The climate was usually warm with considerable rain and very often high winds. No summer frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

10. The soil is chiefly a good brown loam with clay subsoil and very good for farm land. The surface is broken across the south by the coulée along Notukeu creek, but is gently rolling north of the creek. It is all bare prairie. There is no timber and no hay. The water is somewhat alkaline and is very scarce, except in the creek. The creek is said to stop running in the summer, but has water in holes. It is about one chain wide, two feet deep and has a current of about one mile per hour. The land is not liable to be flooded. There are no water-powers. The climate was usually warm with occasional showers and many high winds. No frosts were noticed. There is no fuel, stone quarries or minerals and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

*Range 12.*

5. (East outline.) The north part of this line is sandy loam and clay and is suitable for farming or grazing as it is gently rolling prairie except the first three and one-half miles which are very rough and hilly, but have fairly good grass. There is no timber, nor hay to any extent. There is no surface water and no water-powers. The climate was warm with some rain, but no frosts. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

6. (East outline.) The soil is light clay loam and clay subsoil, suitable for farming or grazing. The surface is gently rolling prairie, with no timber, but there are some hay meadows. A branch of Pinto creek crosses the east boundary of section 12, running east. The water is slightly alkaline and the creek is almost dry although the supply of water would likely be permanent. The land is not liable to be flooded and there is no water-power, fuel, stone quarries or minerals. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

7. The soil in this township is chiefly a loam with a clay subsoil with the exception of some ridges which are gravelly and stony and some coulées which have some alkaline flats of heavy clay and considerable stone. The northeast quarter of the township would make very good farm land as also part of the southeast quarter. However, the latter is broken considerably by a big coulée with several side coulées running into it. The west half is very rough and almost entirely very hilly. No very large hills are found but almost continuous small ones. It is also considerably higher than the east side and the general slope is towards the southeast. About two-thirds of the township would be fit only for grazing. There is no timber and no hay. The water is rather alkaline and is only found in holes in a creek bed in the big coulée which runs out to the east on the east boundary of section 1 and in a large slough near the centre of the township. The creek rises near the west side of the township and flows easterly, going out at the east boundary of section 1. The water supply is not likely permanent as the creek had almost stopped running at the east boundary and water is not at all plentiful. The land will not be flooded. There are no water-powers. The climate was warm with some winds and some heavy rain. There is no fuel, stone quarries or minerals and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

8. The soil in this township is a brown sandy loam with clay subsoil, in general, but a few flats with clay and alkali, and ridges with gravel are found. It would make fair farm land except in a section or two at the southwest corner, which are

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

## Range 12—Continued.

quite rough and hilly. The rest of the surface is rolling, with the creek valley running north through the centre. There is no timber and no hay. The water is rather alkaline, except in the pools near the head of the streams, where it is fresh and good. The surface water would likely all dry up in the summer. The land is not liable to be flooded. There are no water-powers. The climate was usually warm, but we had considerable rain, wind and some frost. There is no fuel, minerals or stone quarries. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

9. The soil in this township is a brown loam with clay subsoil and will make good farm land. The surface is all gently rolling bare prairie. There is no timber or hay. The water is a little alkaline and is scarce, except in the creek or creek beds. One branch of the Notukeu creek runs across the north part of the township, and is about eighty links wide, one and one-half feet deep and has a current of about one mile per hour. Another branch comes in from the south but had stopped running. However, water was plentiful in deep holes, but alkaline. The land is not liable to be flooded. There are no water-powers. The climate was warm with a fair amount of rain and some high winds. No frosts were noticed. No fuel, stone quarries or minerals were found. The only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

10. The soil in this township is rather more gravelly and sandy and will not make as good farm land as that east of it. The north part will make fair farm land. The surface is gently rolling bare prairie. There is no timber and no hay. There is very little water in this township, but a little can be found in the early part of the summer in holes in an old, small creek bed at the north side of it. The water is good but not plentiful and not likely permanent. There are no water-powers. The climate was warm with some rain and high winds. No frosts were noticed. There is no fuel, stone quarries or minerals. The only game seen was antelope and jack-rabbits.—*W. G. McFarlane, D.L.S., 1908.*

## Range 13.

5. (East outline.) The soil of this township is mostly light clay or sandy loam with clay subsoil, suitable for farming or grazing. The surface is slightly rolling bare prairie. There is no timber but there are a few small hay meadows of little account. The water is scarce and partly alkaline. There are no streams of any importance, although a few little creeks were crossed, which are drying up. There are no water-powers, and the land is not liable to be flooded. The weather was warm and showery in June. No fuel, stone quarries or minerals were seen. Antelope were fairly numerous.—*W. G. McFarlane, D.L.S., 1908.*

6. (East outline.) The soil is a sandy loam with clay subsoil and is rather stony in places, but would make fair farming or grazing land. The surface here is also bare prairie, but is much more broken by coulees than that to the south and would be rather rough for good farm land. There is no timber and very little hay. Water is alkaline in small streams and very scarce. The land is not liable to be flooded and there are no water-powers. The weather was warm with occasional rains. No frosts were noticed. There is no fuel, stone quarries or minerals, and the only game seen was antelope.—*W. G. McFarlane, D.L.S., 1908.*

7. The township is reached by a wagon trail from Swift Current to Pearce's ranch, from which there are several trails or tracks running southerly; any one of these leads near to this township. The soil is a brown loam of varying depth underlain by a sandy clay which is often stony and always very hard. The surface is prairie, very hilly at

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 13—Continued.*

the north but smoother towards the south and west, where the land is somewhat lower; the ridges and hills are mostly stony especially in the northern and eastern parts where it is very rough. There were many small sloughs and a lake in section 19, from which plenty of fresh water may be obtained, but the lake is somewhat alkaline. The nearest available fuel is lignite or brown coal in township 7, range 16. There are no minerals or stone quarries. Frost appeared in August, forming a thin coating of ice.—*Geo. H. Watt, D.L.S., 1908.*

8. The township may be reached by taking the Pelletier lake trail from Swift Current to Pearce's ranch and taking an old trail from there southerly. The soil is good in places but the southern part of the township consists of high hills all of which are stony on the top. There is no timber. Water is found in Notukeu creek which crosses the northwest corner of the township. It is somewhat alkaline and dries up in dry weather. Among the hills at the south there are many sloughs where small quantities of hay may be cut. There are no water-powers, fuel, stone quarries or minerals. Antelope was the only game seen.—*Geo. H. Watt, D.L.S., 1908.*

9. The old Pelletier lake trail crosses range 13 a few miles north of this township and there is an unused trail from it into this township, in section 35. The soil is a brown loam with a sandy subsoil and would grow good-crops if there was sufficient moisture. The township is open prairie with a few small trees and bushes along Notukeu creek in section 5. There are no hay sloughs of any size. The water in Notukeu creek is brackish, but that in the creek running in from the north is good. Notukeu creek dried up in the fall. The stream at the time I was there was about six feet wide with but a few inches of water running through; there were many large and deep holes along it which would, I think, contain water in the driest weather. There was a severe frost about August 1, the only one I noticed during the summer. No stone in place, coal, or minerals were found. The land is good but stony on the ridges.—*Geo. H. Watt, D.L.S., 1908.*

*Range 14.*

7. The township may be reached by taking the Pelletier lake trail from Swift Current to Pearce's ranch and then taking the trail to Hoff's ranch on Frenchman river. Hoff's trail passes along the whole west boundary of this township. The soil is a brown earth overlying sandy or gravelly clay. The grass is mostly good showing good soil. The surface is all prairie, pretty rough in places, and the ridges are mostly stony on the top. There are numerous sloughs of fresh water but there is not much hay around some of them. Many of the sloughs would dry up in a dry summer. The atmosphere is very dry and the township is subject to hot winds in the summer which would, I think, be disastrous to standing grain. There was a severe frost on August 1. There is no fuel in the township but there are coal veins opened twenty-five miles to the west. I saw no minerals of any kind or stone of value. Antelope and duck abound.—*Geo. H. Watt, D.L.S., 1908.*

8. This township can be reached by taking the Pelletier trail from Swift Current to Pearce's ranch and then following the trail to Hoff's ranch which crosses the western part of the township. The soil is a brown peaty loam of varying depth overlying a sandy or gravelly white clay which is very hard. Much of the surface of the township, which is all prairie, is stony, especially on the ridges. Along Notukeu creek there is a considerable area of alkaline soil and barren ground. The water in the creek is alkaline but the sloughs are mostly fresh. There was a sharp frost in

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 14—Continued.*

August, but no others which were noticed this summer. Lignite may be found in the township to the west. There are no stone or minerals of value.—*Geo. H. Watt, D.L.S., 1908.*

*Range 15.*

7. This township is on the branch of the old Pelletier lake trail from Swift Current, which leaves the main trail about two miles south of Pelletier lake and crosses Frenchman river at what is known as the 'Fiftymile' crossing. The trail is very little used, as it is very hilly from the south end of the township to Frenchman river. The soil is a brown loam overlying clay, sandy clay or gravel subsoil. Along the river there is considerable alkaline land. The grass for the most part is fair. The hills are stony. The whole surface is prairie and rolling, with no sloughs. There is an alkaline creek about ten links wide, but it dries up altogether in dry weather. The climate is dry and there exist at times dry hot winds. Fuel in the shape of lignite may be obtained about twenty miles west. There are no stone quarries or minerals. Game consists of antelope and duck.—*Geo. H. Watt, D.L.S., 1908.*

8. This township is situated on the branch of the old Pelletier lake trail which runs to the 'Fiftymile' crossing of Frenchman river. The trail was very dim, and as the prairie had been burned bare it was still less noticeable so that it was not noted when chaining. The soil is a brown peaty soil overlying sandy clay or gravel, which is very hard. The ridges, of which there are a great many, are stony and bare on the top. The township is all prairie. There are several small sloughs, but they do not contain much hay. The water in Notukeu creek is alkaline and dries up in the fall in dry seasons, but that in the sloughs is fresh. This part of the country is somewhat dry with hot dry winds occasionally. Hard frosts occurred about August 1, but it was the only one noticed. Fuel in the shape of lignite coal may be obtained about twenty-five miles to the west. There are no stone or minerals. Game consists of antelope and ducks.—*Geo. H. Watt, D.L.S., 1908.*

*Range 16.*

5. The township is reached by means of the Pelletier lake trail from Swift Current, which, though a well travelled trail, is very hilly in places. The ford on Frenchman river is a very good one and is called the 'Seventymile' crossing. The only part of the township in which the soil is fit for cultivation is that part lying south of the broken country forming the south side of the river valley and parts of the river flat itself, which are of very rich soil. The remainder of the township is extremely rough and hilly. There are no sloughs in the township, all the water available being that of the river and springs flowing into it. The river is about one chain wide and runs between cut banks about fifteen feet high, which, with the slimy or muddy nature of the bottom, make it unfordable except at long intervals. The river water is good. Along the river, scrub and willow are found and occasionally poplar and other woods. There are no stone or minerals. Game consists of antelope, duck and beaver.—*Geo. H. Watt, D.L.S., 1908.*

7. The best route by which to reach this township is the Pelletier lake trail from Swift Current to about three miles from where the trail leaves the valley below Pelletier lake. From this place there are many dim trails running a short distance in a southwesterly direction and from there it is possible to travel across country almost anywhere. The soil is very poor, being gravelly and stony on the hills and pure gravel or gumbo on the flats. There may be a few good farms but the greater part is very poor, even for grazing. An alkaline creek flows through the eastern portion in

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 16—Continued.*

the early spring, but soon dries up. There was no water in it in June. There is no hay, fuel, water-powers, minerals or stone quarries. A number of antelope were seen.—*Geo. H. Wall, D.L.S., 1908.*

51. The trail from Battleford to Birch lake passes through sections 25 and 35 of this township and forms the best route for reaching it, as it is generally in good condition. There are some hills to be crossed but they present no special difficulty. One creek, which has to be crossed might cause trouble in a wet season. The soil in this township consists of a thin layer of black mould with a subsoil generally of clay loam or sandy clay. In many places stones occur but not so thickly as to interfere with agricultural operations. About half of the township has first class soil, the remainder being second class. Practically the whole of the surface is covered with either a light or heavy scrub poplar and willow. A great many small open spaces occur especially in the northwest portion of the township and also near the shores of lake Macleod. About eighteen per cent of the surface is water, ten per cent open, and the remainder scrub poplar and willow, interspersed with scattered poplar and balm of Gilead averaging eight inches in diameter. Sections 2, 3, 4, 5 and 6 are rolling, while the remainder is gently rolling country. Poplar and balm of Gilead averaging about eight inches are scattered all over the township. A small amount of spruce is found near the small lakes in sections 5 and 6. These trees average about eight or nine inches in diameter the largest being about fourteen inches. Altogether about one hundred thousand feet of lumber could be cut. Grass grows luxuriantly in all the open places throughout the township. Scattered over the township are a few very small hay meadows. The upland grass should make good hay. This township is well supplied with water. Birch lake occupies about half of sections 25 and 36 and along the south outline of the township is a string of lakes connected by small creeks. Several sloughs are to be found throughout the township, all of which contain good drinking water. Lake Macleod, a rather shallow lake of 2,000 acres area occupies parts of sections 10, 11, 14, 15, 16, 22 and 23. The water is slightly brackish. The supply is sufficient and permanent. No land is liable to be flooded to any serious extent. The small streams along the south outline average about eight feet wide and six inches deep with an average current of three miles an hour. No water-power could be generated. The climate was cool, the days being moderately warm, considerable rain was experienced. No summer frosts occurred. Fuel in the shape of poplar can readily be procured throughout the township. No coal or lignite veins were seen. No stone in place was observed, although loose stones for building purposes are abundant. No minerals of economic value were found. Game seemed to be rather scarce, as the Indians have for a long time made this district their hunting ground. An occasional prairie-chicken or partridge was seen, while ducks of various kinds were very plentiful. Trails of red deer and moose were noticed. Rabbits and other small game did not appear to exist. Elk (Wapiti) had evidently lived here formerly but no recent traces of them were noticed. Birch lake and the series of small lakes mentioned contain an enormous quantity of fish, those noticed being jackfish (pike), whitefish, sucker and pickerel (doré).—*H. S. Holcroft, D.L.S., 1907.*

*Range 17.*

5. This township is situated on the trail from East End to Wood mountain and may be reached by taking the trail running south from Gull Lake station on the Canadian Pacific railway to the intersection of the above mentioned trail and then following along the latter to the township. They are both good trails. The surface is prairie, except some brush along Frenchman river serving only as fuel. In the southeastern part of the township and in the western and northern portions the sur-

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 17—Continued.*

face is very rough, just a succession of coulées and breaks, making it totally unfit for cultivation. There are no hay meadows. The water in Frenchman river is good. A few springs rise in the northern portion but like the majority of the springs in this portion of the country, they do not run far before they are absorbed by the atmosphere and the parched nature of the ground. The climate is exceedingly dry, making agricultural pursuits hazardous. I saw no stone quarries, or minerals. A few antelope were seen and many traces of beaver in the river.—*Geo. H. Watt, D.L.S., 1908.*

7. This township lies between the trails running south from Gull Lake station on the Canadian Pacific railway and Swift Current. Probably the latter trail is the nearer. If the Pelletier lake trail is followed southerly to a point about three miles south of the lake a fairly level road may be had across country to this township. The soil is suitable for raising grain but in many places is underlaid by hard clay or gravel. The surface is entirely prairie, there being no timber or scrub of any kind found on it. There are no extensive hay sloughs. The water found in the sloughs is good. There is no fuel in the township but there is every evidence of coal in the township south of this one. There are no stone quarries or minerals. A herd of about twenty antelope was seen several times.—*Geo. H. Watt, D.L.S., 1908.*

*Range 18.*

5. The best road to this township is the East End trail from Gull Lake station on the Canadian Pacific railway as far as East End and mountain trail and then the latter eastward till the township is reached. It is a well travelled road all the way. Where the surface is not broken by coulées the soil is very good, being principally a sandy loam with very little fine sand and is suitable for the growth of grain or root crops. In the coulées the surface is usually bare clay or gravelly. There is a small quantity of poplar and willow in the coulées running up into sections 5 and 6 and it is the only fuel known. There are no hay marshes, water-powers, stone quarries or minerals. The water in the sloughs, which are not numerous, is good. Game consists of duck and antelope.—*Geo. H. Watt, D.L.S., 1908.*

6. The township is best reached by taking the trail from Gull Lake station on the Canadian Pacific railway to East End as far as the north boundary of township 8 and then striking southeasterly across country till the township is reached. The surface of the township is very rough and broken by at least two large coulées which with the coulées running into them and the amount of country lying in them almost unfits the township for farming. It is a good grazing country, there being plenty of good water in the sloughs and in Mule creek which is a spring creek and does not dry up. There are a few clumps of trees in sheltered places in the coulées. In all the coulées there is evidence of coal, probably lignite. In former years beds of coal have been burned, as is evidenced by the baked clays with their brilliant colours which attract the eye from long distances. There were some beds of sandstone outcropping in one place, but I could not say whether they were the edge of an extensive bed or were but the remains of one of the huge boulders that are occasionally met with. There is little or no hay and no water-powers nor minerals. Antelope were plentiful.—*Geo. H. Watt, D.L.S., 1908.*

7. The township is most easily reached by taking the East End trail from Gull Lake station on the Canadian Pacific railway to the north boundary of township 8, from where the best route to follow is across country till the township is reached. The soil is generally a sandy loam or clay with clay subsoil but in places the clay has been washed away leaving the surface stony or gravelly. The surface is rolling but broken



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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 18—Continued.*

by coulées, some of them well defined. There are a number of sloughs especially in the southwestern portion, some of which are deep while others to a limited extent grow some hay. The water in the sloughs is good. Fuel in the shape of lignite may be had in section 16 of the township to the west. There are no water-powers, fuel, stone quarries or minerals. Antelope and duck abound.—*Geo. H. Watt, D.L.S., 1908.*

*Range 19.*

5. The trail from Gull Lake station on the Canadian Pacific railway to East End intersects the trail from East End to Wood mountain a few miles west of this township and the latter trail crosses the township in a northwesterly direction, the two trails thus forming an excellent road to town. The greater portion of the township is broken by the valley of Frenchman river, and a system of ravines which break up the northwestern part of the township, while the remainder is somewhat rough and stony. There are a few clumps of poplar and willow in sheltered, moist spots in the coulées. There are no hay meadows, water-powers, stone quarries or minerals of economic value. Game is scarce. A few beavers were working on the river and occasionally an antelope was seen south of the river. In the coulées there were a number of springs of water, some fresh, some alkaline and some strongly impregnated with hydrogen sulphide. These springs did not give out enough water to form a stream large enough to reach the river, but after running for less than a mile they gradually dwindled and eventually dried up altogether. There are a few small sloughs, which with the springs and the river, furnish plenty of water.—*Geo. H. Watt, D.L.S., 1908.*

6. This township is reached by taking the trail from Gull Lake station on the Canadian Pacific railway to East End and following it to about the north boundary of township 8, a little beyond which the trail branches, the one leading east running as far as the coal mines which are located in section 16, township 7, range 19. From here the township is easily reached across country. The surface of this township is undulating or rolling. The middle and northerly portions support good thick grass but some of the remainder of the township is stony. The whole, however, with the exception of a few small coulées and stony ridges might be cultivated with good results. There are no hay sloughs, timber of any kind, stone quarries, water-powers or minerals. Fuel in the shape of lignite coal may be had in the township to the north. On the southern part there are no sloughs, but deep one are found in the northeast part of the township. No game was seen.—*Geo. H. Watt, D.L.S., 1908.*

7. The trail running northwesterly from the coal mine in section 16 joins the East End-Gull lake trail in about ten or twelve miles and this is the best road between the township and the railway. The south half and the eastern one-third of the township are the most suitable for farming but the northwestern portion is broken by a few coulées and a large alkaline desert. There is no wood or brush found, the whole being bare prairie. There are no hay meadows, but a few sloughs occur with good water. The small creek crossing section 20 dries up in the summer. It is a branch of Rock creek. There are no stone quarries, or water-powers. In a coulée in section 16 a seam of coal is exposed and from the appearance of the trail from it I would presume that quite a number of persons come there for fuel. There are no doubt several seams but the uppermost one, which is the one mined, is about four feet thick. I am told that it makes good fuel for threshing engines, but the sample I got would not burn except with a very strong draft.—*Geo. H. Watt, D.L.S., 1908.*



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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 20.*

4. This township is most conveniently reached by a trail from Gull Lake station on the Canadian Pacific railway, which crosses Frenchman river in section 6, township 5, enters this township in section 34 and goes in a southeasterly direction into Montana. It is a good hard trail, the only difficulty met with being in crossing Swiftcurrent and Frenchman rivers. It is necessary to divide a load to make these fords and to get out of the valleys. The whole township is open, gently rolling prairie, mostly of a clay loam with a clay subsoil, although considerable has been classed as gumbo. The latter really seems to be a dark clay which has become very hard owing to the lack of moisture. Considerable gravel is found mixed with the clay in many places in the township. While the soil and surface would warrant the tilling of the soil the climatic conditions would suggest ranching or possibly mixed farming as the more profitable. The rainfall is light. Most of the sloughs were dry and growing good hay. What water was obtainable from a few sloughs was very good but these I believe would be dry by August or September. There was no indication of coal or other minerals and the only fuel available is lignite in township 7, range 19 or wood from the Cypress hills to the northwest, about twenty-five miles. No building stone appears. Antelope were plentiful and quite a few duck were seen.—*J. Waldron, D.L.S., 1908.*

5. This township is most conveniently reached by a trail from Gull Lake station on the Canadian Pacific railway. It is a good smooth road at all seasons of the year the only difficulty being the crossing of Swiftcurrent creek and the settlers expect to have this bridged in the very near future. With the exception of the valley of Frenchman river, which flows in a southeasterly direction from the northwest corner of the township leaving it in section 24, the surface is quite smooth. The soil south of the valley is mostly a gravelly clay with a few inches of clay loam on the surface. It is good pasture land and is mostly suited for ranching. The river valley has a lighter soil nearly free of gravel or stone and could be made very productive by irrigation. Frenchman river, the only water on the surface, does not contain any water-powers but has sufficient fall to make it useful for irrigation purposes. Quite a few beaver have their dwellings in the small willow scrub along its banks, and the deep pools afford good fishing, the principal fish being gold-eye. We experienced no frosts, but the season was very dry. Scrub poplar and willow in very limited quantities grow in the coulees leading into Frenchman river and is the only fuel supply nearer than the Cypress hills. There are some indications of coal of very poor variety of lignite. The seams crop out along the river banks but are not thick enough to be of much use. No other minerals occur. Beaver, ducks and antelope were seen.—*J. Waldron, D.L.S., 1908.*

6. This township is most conveniently reached by a good, hard, smooth trail from Gull Lake station on the Canadian Pacific railway which enters it in section 32. This trail is in good condition at all seasons of the year. The whole township is open prairie, the east side being nearly level and of a deep loam covered with abundance of hay and grass. The central and western part is slightly more rolling but as productive as the east. The southwesterly part becomes more broken as it approaches Frenchman river, the slopes of which are rough and stony. Sections 7, 5, 4 and 3 are too rough for agricultural purposes. Most of section 6 is in the river valley and is of a sandy loam which would be very productive, if irrigated. Frenchman river, the only source of surface water in the township, with the exception of a few sloughs which dry up in the early part of the summer, is about seventy links wide with a current of three miles an hour. It has no falls or water-powers, but by dams, could be made useful for irrigation. It is soft in the bottom and dangerous to cross with horses except at the gravelly bars which are not numerous. The best crossing we found is in the southeast quarter of section 6. A small quantity of small

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## TOWNSHIP'S WEST OF THE THIRD MERIDIAN.

*Range 20—Continued.*

poplar grows on the north slope of the river in sections 8 and 4. Small veins, a few inches thick, of a very poor lignite coal appear along the river slope but do not appear to be of any commercial value. A supply of wood fuel may be obtained in the Cypress hills, township 6, range 21, or good lignite is obtainable about the centre of township 7, range 19. No stone quarries occur but plenty of surface stone suitable for building can be had on the river slope. The weather during the day was all that could be desired but the nights during May were not without frosts. No minerals of economic value appear and the only game seen was antelope, although there were signs of beaver along the river.—*J. Waldron, D.L.S., 1908.*

7. This township is most conveniently reached by a good trail from Gull Lake station on the Canadian Pacific railway, which enters the township in section 34 and passes through it in a southwesterly direction. The surface is open rolling prairie and quite smooth with the exception of parts of sections 9, 10, 4, 3 and 6 which are a little rough. Considerable alkali is met with in the northeast part of the township but with the exception of these alkaline spots the soil is mostly a deep clay loam with a clay subsoil and is very suitable for farming, so much so, that it was eagerly sought for by intending settlers and has now been nearly all taken up. Hay and pasture is abundant everywhere in the township. Large herds of cattle and horses, the property of ranchers along Swiftcurrent creek, were grazing here, and their sleek condition was a living testimony of the splendid quality of the grass. No timber of any kind grows in the township but it may be readily obtained about six miles west, in the Cypress hills. Some evidences of soft coal appear where badgers had been digging in the southeast part, but no veins appear on the surface. Plenty of fuel can be obtained from a lignite vein of very good quality in about the centre of township 7, range 19. The only surface water, with the exception of some small sloughs which have the appearance of being dry most of the summer, is in lake Lawrence in section 35, and a small stream of fresh water which rises in section 4 and passes through sections 5 and 6. Lawrence lake is a shallow fresh water lake on the south shore of which there is some good building sand. No streams with any water-powers occur. At the beginning of May the days were beautiful and bright, but frosts occurred on some of the nights. No stone quarries or minerals appear. Quite a few antelope and many coyotes and badgers were seen.—*J. Waldron, D.L.S., 1908.*

*Range 21.*

5. This township is most conveniently reached by trail either from Maple Creek or Gull Lake station on the Canadian Pacific railway. These trails join in the valley of Frenchman river in township 6, range 21, and thence there is no difficulty in driving directly across the prairie to this township. Gull Lake trail is much the smoother. The whole township is open prairie, no timber of any kind growing in it. The northeast part is hilly and rough while the remainder is rolling prairie, increasing in elevation going westward. The central part is suitable for cultivation while the east and west is better adapted for grazing. The soil is chiefly a clay loam with a clay subsoil. A coulée leading up from Frenchman river through sections 36, 35, 26, 23 and 14 forms a valuable hay meadow. A spring occurs at the upper end of it and has the appearance of giving a good water supply if opened up. A small alkaline slough was found in section 8, and was the only surface water obtainable. A dry creek passes through section 32 and indications point to a large flow of water in wet seasons. Grass was plentiful everywhere and of good quality. No frosts were experienced. Wood in township 7, range 22, is the nearest fuel obtainable. No coal veins or other minerals occur. Surface stone, suitable for building, may be gathered in the east part of the township. Coyotes and kit foxes were the only animals seen.—*J. Waldron, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 21—Continued.*

6. This township is readily reached by a trail from Maple Creek station on the Canadian Pacific railway, which enters the township in section 31, or by a trail from Gull Lake station on the Canadian Pacific railway, which enters the township in sections 25 and 24. The latter is the more direct and smoother road and is good at all seasons of the year. The surface is very much broken by Frenchman river and the many coulées that lead into its valley. This valley, which is from forty to sixty chains wide, comprises the greater part of sections 31, 29, 28, 27, 26, 24, 13 and the easterly half of sections 12 and 1. It is mostly a sandy loam with a sandy clay subsoil and in its original state was covered with sage brush and not very productive. A very extensive and systematic irrigation scheme is just about completed by Messrs. Enright and Strong, more familiarly known as the owners of the z-x (Z bar X) ranch, whereby the valley as far as the centre of section 27 will become, and in the upper part, has become, very productive. Mr. Morrison, who lives in section 24, is developing an irrigation scheme by which he will be able to irrigate the remaining part of the valley in this township and has a splendid chance of being well rewarded for his labours. The slopes leading down to the river bottom are rough and stony. The central part of the south portion of the township is comparatively smooth and suitable for farming. The remainder is more suitable for grazing. A beautiful spring of fresh water rises in section 29, and this with Frenchman river is the only surface water of a permanent nature. No waterfalls or power exists. There is no fuel in the township, but plenty can be obtained in township 7, range 22. No veins of coal or other minerals occur. No game of any kind was seen. Insufficient rainfall seems to be characteristic of this region. No summer frosts were experienced.—*J. Waldron, D.L.S., 1908.*

7. The southerly part of this township is readily reached by a trail from Maple Creek station on the Canadian Pacific railway, which enters the township in section 6, or by a trail from Gull Lake station, which follows the Swift Current creek coulée through the township. Either of these trails is a good hard road. The soil is clay loam with a clay subsoil. This surface is broken and in the southwesterly part very hilly. Some small poplar and willow, with an occasional spruce is found among the hills on the west. There are no minerals or stone quarries but plenty of wood may be found for fuel. There are many springs in the hills. The settlers in this township are mostly engaged in stock raising and by irrigating are able to cut abundance of hay.—*J. Waldron, D.L.S., 1908.*

*Range 22.*

5. This township can readily be reached by trail either from Maple Creek or Gull Lake stations on the main line of the Canadian Pacific railway. They both enter township 6 and from there they merge into the trail up the valley of Frenchman river; it is good travelling across the prairie, after getting on top of the slope to the river, but the road from Gull Lake station is the smoother and is more to be preferred for heavy loads. The soil of this township is a good clay loam, about six inches deep, with a clay subsoil and is well adapted for mixed farming. Plenty of hay can be cut almost anywhere in this township but especially on the edges of the sloughs, of which there are quite a few, and all contain good fresh water. The western part is rough and hilly, especially sections 18 and 19. The remainder of the township is open, rolling prairie, smooth enough for easy cultivation, except sections 36, 35, 24, 13 and 12, through which a broken coulée passes. This contains many fresh springs and affords splendid shelter for cattle. There are no creeks of any kind. The climate was warm and free from frosts. Rainfall seemed more plentiful than in the ranges farther east. This is possibly due to its higher elevation and proximity to the Cypress hills. No

## TOWNSHIPS WEST OF THE THIRD MERIDIAN

*Range 22—Continued.*

coal appears, but wood for fuel is plentiful about six miles north. No minerals of economic value occur. Antelope and duck were the only game seen.—*J. Waldron, D.L.S., 1908.*

6. This township is readily reached by trails from Gull Lake or Maple Creek station on the Canadian Pacific railway, both of which enter the northerly end of the township, or by a trail from Chinook, Montana. The trail from Gull Lake station is smoother and better than the Maple Creek trail. The greater part of the township is very rough and broken. Frenchman river crosses the township about the north chord. The valley is from one to two miles wide and has very high rough banks on either side. The high lands north and south of the valley are inclined to be hilly with considerable surface stone. The soil is mostly clay loam with clay subsoil but quite a lot of sand and gravel appear in the proximity of the river. The township is suitable for ranching. The uplands grow good hay while the deep valley affords splendid shelter for stock. Two ranchers have done some irrigation work to make the valley more productive. Frenchman river is about fifty links wide, with a current of about three miles an hour. No falls or water-powers occur. Most of the coulées, on the north slope of the river, contain small poplar and willow, while on the south side a few spruce appear in section 7. There is just sufficient to meet the immediate needs of the settlers. The remainder of the township, with the exception of a little willow along the river, is open prairie. Small veins, a few inches thick, of lignite crop out frequently along the river valley. I was informed that it burns very well and is very suitable for heating purposes. Many good fresh springs rise on the north slope. During June we experienced no frosts and the climate seemed very salubrious. No stone quarries or minerals of economic value were found. Chicken and sage hens were the only fowl seen. No other game was noticed.—*J. Waldron, D.L.S., 1908.*

7. This township can be best reached by a surveyed trail from Maple Creek, a station on the main line of the Canadian Pacific railway. It is hilly but hard most of the way and has good water along it. This trail is known as the mail route from Maple Creek to East End postoffice which is in section 26. This township is in the Cypress hills and is very much broken by coulées, a great many of which are wooded with small poplar and willow and a few spruce. The smoothest part is south of the south chord and is mostly rolling prairie. Many ranchers are settled along the small creeks which contain a plentiful supply of good spring water. Some of them have done a little cultivation with good results. It is essentially a ranching district. The coulées form splendid shelter and grazing grounds for stock. The soil in the hills is mostly sandy or gravelly, while in the more level portions the soil is generally a clay loam with a clay subsoil. Small surface stone are plentiful. Plenty of wood for fuel is found in the coulées and timber suitable for building, but only enough for the immediate needs of settlers. Small veins of coal crop out along the slopes of creeks. It is of a soft variety, but burns very well. No other minerals occur. They have summer frosts in the hills. Splendid hay can be cut on the uplands. No stone quarries were seen. Quite a few timber wolves infest this region and are a source of annoyance to the ranchers. An occasional deer is seen.—*J. Waldron, D.L.S., 1908.*

*Range 23.*

5. The west side of the southeast part of this township is somewhat hilly while the remainder is mostly rolling prairie. Gravelly clay predominates with a few inches of fertile loam on top. Quite a number of small sloughs are scattered throughout the township and around these hay grows in abundance. Apart from the sloughs there is

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## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 23—Continued.*

plenty of grass for grazing purposes. It is best suited for ranching or mixed farming. There is a good trail from Maple Creek station, Canadian Pacific railway, into the township north of this and from there travelling across the prairie into this township is good. The sloughs are all fresh and some springs of fresh water appear in the hills in the west part. There is no fuel in the township but wood is plentiful in the Cypress hills, in the township north of this. No minerals of economic value occur. Ducks were plentiful and a few antelope were seen.—*J. Waldron, D.L.S., 1908.*

6. This township is most conveniently reached by a trail from Maple Creek station, Canadian Pacific railway. It is somewhat hilly but is hard and should be in good condition most of the year. On the uplands above Frenchman river, which flows through the township about the north chord, the soil is mostly a clay loam with a clay subsoil. In the river valley it is mostly a sandy loam with a sandy clay subsoil, but gumbo, gravel and stony clay is often met with. The uplands produce good hay with sufficient rainfall and are suitable for farming or ranching. In the river valley the soil is productive where irrigation has been resorted to. The numerous coulees leading into the river valley are partly wooded with small poplar and willow with an occasional spruce and the open spaces form splendid grazing grounds and shelter for cattle. The north end of the township is in the Cypress hills and is very rough and hilly. The only surface water is in Frenchman river, and a small spring creek from the Cypress hills in section 19. The climate is free from summer frosts but was very dry; small seams of a poor lignite coal appear along the river, but they do not appear to be of any economic value. No other minerals or quarries occur, but surface stone is plentiful for building purposes. With the exception of a few ducks and an occasional deer, game is very scarce.—*J. Waldron, D.L.S., 1908.*

*Range 26.*

1. This township is readily reached by trail from Maple Creek, a station on the main line of the Canadian Pacific railway. There is also a good trail from Montana on the south. The surface is undulating to rolling prairie. The soil is sandy or light clay and best suited for ranching. The general indications point to comparatively little rainfall in the summer months. There are no large hay meadows but hay grows well over most of the township for so little rainfall. There were no summer frosts. The only water supply was Battle creek and it was not running in August. There are no possible water-powers on the creek. The banks vary from fifteen to thirty feet. There is no timber or fuel of any kind in the township. A fairly good burning coal may be obtained in the township west of this. The nearest timber is in the Cypress hills, near Tenmile. There are no stone quarries, but there is plenty of surface stone. There are no minerals in this township. A few antelopes were seen.—*J. Waldron, D.L.S., 1908.*

2. This township is open and for the most part gently rolling prairie. There is none that can be called hilly. The soil is variable. In the vicinity of Battle creek, which passes through the west half of the township, it is mostly a sandy loam. Away from the river, clay loam with clay subsoil predominates. Gumbo is frequently met with. Quite a few surface stone are scattered throughout the township. Battle creek could be dammed and some of the adjoining lands made productive by irrigation. The remainder is essentially a grazing district. The rainfall does not appear to be sufficient for agriculture alone. Because of the dry season the grass was short, but of good quality. There is no fuel of any kind in this township. The nearest supply is a soft coal in township 1, range 27, or wood from the Cypress

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 26—Continued.*

hills about forty-five miles to the northwest. No minerals of economic value occur. The only stone available for building is the ordinary field stone. A few antelope were seen. The township can readily be reached by a good trail from Maple creek, a station on the Canadian Pacific railway.—*J. Waldron, D.L.S., 1908.*

3. This township is best reached by a trail which runs south from Maple Creek station past the east end of Cypress lake and enters the township in section 32. This is a splendid trail and suitable for heavy loads. The soil is chiefly clay loam with a clay subsoil, and is suitable for farming or ranching. The surface is undulating and is all open prairie. Hay is plentiful, but water is scarce, being found only in small sloughs early in the season. The country was very dry but judging from what information could be obtained from ranchers and from existing water courses, it was an exceptionally dry season. The climate is free from summer frosts and with sufficient rainfall the township would produce grain and vegetables, and would be very suitable for grazing. No minerals, waterfalls or quarries exist. Game is very scarce.—*J. Waldron, D.L.S., 1908.*

4. A good hard trail from Maple Creek station, Canadian Pacific railway, enters this township in section 33 and passes south through the township and on to Havre, Montana. Many springs cross it between Cypress lake and Maple creek, affording a plentiful supply of fresh water at convenient intervals. Nearly the whole township is level, open prairie, the only exception being a little broken land along the river in sections 17 and 18. The soil is mostly gumbo in the easterly part, clay in the centre, and a more sandy soil along Battle creek. The gumbo was very hard after the little covering of vegetable loam was removed. In the gumbo area the grass was short and thin, but improved as we got nearer the river. While it is short and thin, ranchers in sections 31 and 20 claimed it to be better for cattle and horses than the longer and coarser grass which grows in such abundance in the Cypress hills. Large herds of horses were brought from the hills to graze in this township. No hay meadows occur. Irrigation has been carried on quite extensively along Battle creek, and with a plentiful supply of water the ground becomes very productive. Battle creek is a small stream with low banks. The water coming from the Cypress hills is pure and sparkling. It was quite low in July owing to the absence of rainfall and to its being used for irrigation purposes at many points before it enters this township. The climate was very warm and dry. The most convenient fuel supply is about thirty miles northwest, in the Cypress hills. No stone quarries or minerals of any economic value occur. Game is very scarce, coyotes being the only animal seen.—*J. Waldron, D.L.S., 1908.*

50. The northern third of this township is a hilly prairie with a few scattered clumps of poplar and willow brush. There are many small lakes and sloughs, some of which are alkaline. The soil is a sandy loam with a clay subsoil. Prairie-chicken, coyotes and muskrats were seen in small numbers. There was no indication of mineral.—*T. A. Davies, D.L.S., 1907.*

51. This township is hilly prairie with a few scattered clumps of second growth poplar and willow brush. The soil is a sandy loam with a clay subsoil. Small lakes and sloughs are numerous, some of which are alkaline. Duck, prairie-chicken, coyotes and muskrats are to be seen. There was no indication of mineral. Two trails lead into the township from Lloydminster. There was one English settler located in section 28, owning a few head of cattle. He had apparently been in the country for a short time, as improvements on his quarter section were limited to about fifteen acres of ploughed land, besides his house, and a shelter for the cattle.—*T. A. Davies, D.L.S., 1907.*



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 26—Continued.*

52. This township is hilly prairie with a few scattered clumps of second-growth poplar and willow brush. The soil is a sandy loam with a clay subsoil and is first class in the quarter sections adjoining lake No. 11. Sloughs and lakes are numerous, a few of them being alkaline. Two trails lead into the township from Lloydminster. Duck, prairie-chicken, coyotes and muskrats were seen. There were no indication of minerals.—*T. A. Davies, D.L.S., 1907.*

53. Saskatchewan river flows through this township from southwest to northeast, dividing it almost equally. The northern part is again divided by the valley of Pipestone creek, a stream of pure water from one to three feet deep, and eight feet wide, flowing approximately two and one-half miles per hour. The country to the west of Pipestone creek is rough and broken with small lakes, sloughs and marshes which are mostly alkaline. Spruce, tamarack and poplar, two to ten inches, and willow bush grow in large clumps. That part to the east of Pipestone creek is rolling, with clumps of poplar and willow bush. There are a few small sloughs and marshes. The soil to the north of the Saskatchewan is a sandy loam with sand subsoil. Good wild hay grows abundantly. To the south of the Saskatchewan the country is hilly and broken with clumps of poplar and willow bush. The sloughs and lakes are not so often alkaline as in the northern part. The soil is a sandy loam with a clay subsoil. There was plenty of good wild hay. Wheat and oats were grown in small quantities. Game consists of duck, prairie-chicken, coyotes and a few deer. There were no indications of minerals.—*T. A. Davies, D.L.S., 1907.*

*Range 27.*

1. This township is most conveniently reached by a trail from Maple Creek station, on the Canadian Pacific railway, from the north or by trail from Havre to the south. The soil varies greatly from sandy loam with sand subsoil to clay loam with clay subsoil. In fact sandy, gravelly, clay and gumbo soil often appear in the same section. There are also quite a few field stones. It is all open rolling prairie suitable for grazing rather than farming. The grass is of a good quality and very plentiful considering the scarcity of rainfall. Woodpile coulée in sections 8 and 5 furnishes the only available surface water and this is dry late in the season. There is an outcropping of coal in this coulée and it has been mined for local use by the ranchers. The seam is exposed for about one hundred feet and is about thirty inches thick. It is of a rather poor lignite variety but burns very well with a little wood. This is the only fuel in the township. Surface stone suitable for building is plentiful but no quarries or other minerals of economic value occur. Antelope are quite plentiful and are the only animals met with. During August the climate was very dry and warm.—*J. Waldron, D.L.S., 1908.*

2. This township is most conveniently reached by a trail from Maple Creek, a station on the Canadian Pacific railway. It is a good hard trail but is somewhat hilly. It enters the township in section 32 and passes nearly due south through it into Montana. Settlers from the south can most conveniently reach the township by this trail. The surface is open, gently rolling prairie, no timber of any kind being found in the township. The soil, is mostly a clay loam with a clay subsoil. In some places it is inclined to be gravelly and stony. Many small dry sloughs occur and also many dry water courses which indicate more rainfall during some seasons. It was very dry this season but everything indicated that this was an unusually dry year. No frosts appeared. Because of the uncertainty of the rainfall it is essentially a ranching country and the many dry sloughs produce plenty of hay. Battle creek, which



## TOWNSHIPS WEST OF THE THIRD MERIDIAN

*Range 27—Continued.*

passes through the northeast corner of the township was a series of disconnected pools. The nearest fuel obtainable is in township 1, range 27, where a soft coal may be had that burns very well. There is no timber nearer than the Cypress hills. No minerals or stone quarries occur. A few antelope were seen.—*W. G. McFarlane, D.L.S., 1908.*

3. This township is most conveniently reached by a trail from Maple Creek station, Canadian Pacific railway, which enters the township in section 33 and continues nearly due south. This is a splendid trail, being hard and having water at frequent intervals. The surface is open, undulating prairie. The soil is mostly a clay loam with a clay subsoil, with small stone frequently intermingled, except in the river valley, where it is more sandy. Burnt spots frequently occur and are quite unproductive. The township is best suited for ranching, as it has the appearance of being too dry for cultivation. Ranchers in sections 33 and 3 have done some irrigation work and are being well rewarded for their labours. Battle creek flows south through the centre of the township, and is the only water attainable on the surface. It had almost stopped running, but I was informed that it was eight years since it had been so low. The grass was short, but of a good quality, as the appearance of the many cattle feeding testified. The nearest fuel is in the Cypress hills about thirty-five miles to the northwest. No frosts occurred during the survey (July). There were no indications of any minerals or stone quarries. A few antelope and duck were seen.—*J. Waldron, D.L.S., 1908.*

4. This township is most easily reached by a very good trail from Maple Creek, a station on the main line of the Canadian Pacific railway. The surface is mostly gently rolling prairie, becoming slightly hilly in the southwest part of the township. The soil is mostly a clay loam with a clay subsoil, but gumbo and gravelly clay frequently occur. The season was very dry and the hay short. Battle creek, which passes through the northeast and southeast corners, was very low and was the only water obtainable. It was being used farther up stream for irrigation purposes. Dry water-courses occur, which indicate a greater rainfall than occurred this season. The grass is very nutritious, and the township is most suitable for grazing. The soil is suitable for farming, but during dry seasons, such as this one, it would not be very productive. There is no fuel of any kind, but plenty of wood may be obtained in the Cypress hills, about thirty miles to the northwest. No stone quarries or minerals exist on the surface. A few antelope were seen.—*J. Waldron, D.L.S., 1908.*

*Range 30.*

2. This township is best reached by a trail from Maple Creek station, which passes through Tenmile, and goes on south through township 2, range 29, to a customs port of entry and Mounted Police station on the international boundary. This trail is hilly but hard, with water at convenient intervals. The surface is open, level or gently rolling prairie, with quite a few surface stone, especially in the northern portion of the township. The soil is chiefly a clay loam with a clay subsoil, and, owing to the dryness of the climate, is chiefly adapted to ranching, the grass being of a very nutritious variety. Lodge creek passes through the northeast corner of the township. It is a small stream, and at the time of the survey (August) it had stopped running, but a plentiful supply of water was found in the pools. Judging from the many dry water courses, which are cut several feet deep in many instances, the country is subject to heavy rainfalls at long intervals rather than to frequent gentle showers. No water-powers exist. The climate was free from frosts and very dry. The only timber available is in the Cypress hills, about twenty-five miles to the north. A large butte in Montana, just below the international boundary and a little east of range

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE THIRD MERIDIAN.

*Range 30—Continued.*

30, furnishes a splendid variety of coal for domestic use. No stone quarries or minerals occur in the township. Numerous antelope were seen.—*J. Waldron, D.L.S., 1908.*

3. The most convenient route to reach this township is a trail from Maple creek, a station on the main line of the Canadian Pacific railway, south, past Tenmile. This trail goes through range 29 and travelling is good across the prairie from it to this township. The south two-thirds of the township is nearly level except where broken by Lodge creek. The northerly part is higher and more rolling. The soil of the level part is mostly a light coloured clay with not much loam on top. The surface is rough to drive over because of the many holes caused by the loam being burnt. The soil improves in the more elevated part in the north and is here quite productive of good grass and hay. The grass is very short in the low part between the hills and the creek. Cactus is very plentiful. Large herds of cattle were grazing here which would account for the grass being short near the creek as it is the only water supply. It had stopped running in August and was a series of disconnected pools. There is every evidence of a big flow in the spring and the presence of driftwood on the slopes indicates that the whole valley is sometimes flooded. There are no waterfalls or water-powers. There were no frosts but there did not appear to be sufficient rainfall for the cultivation of crops. The nearest fuel is wood in the Cypress hills or coal from a hill in Montana just a little south of the international boundary. No minerals occur and the only stone available is surface stone. No game of any kind was seen.—*J. Waldron, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 1.*

59. The best road to this township is from Kitcooty or Vermilion on the Canadian Northern railway by way of Frog lake and Cold lake wagon road, which passes near this township. The soil consists of from two to twenty inches of loam with clay subsoil. Here and there is a layer of sand under the loam near old creek beds. The surface is covered with the usual aspen or poplar, and scattered birch and jackpine with spruce and tamarack in small quantities in the swamps. There is a little hay land near the shores of some lakes and creeks. The water is all fresh and pure. There are a number of small lakes and creeks in the township giving a plentiful supply of water. The land is not liable to be flooded. The climate is delightful and salubrious, and summer frosts are rare. There is an abundance of wood for fuel. Coal or lignite has not yet been discovered, neither stone quarries nor other valuable minerals. Deer, moose, foxes, mink, rabbits, bear, muskrats and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

60. The best way to reach this township is from Kitcooty or Vermilion on the Canadian Northern railway by way of Frog lake and Cold lake wagon road which passes near the township. The soil is composed of from two to six inches loam with clay subsoil and suitable for general farming. The surface is covered with the usual aspen or poplar with scattered jackpine and in low and swampy places a little spruce. There are some small hay marshes around a few sloughs. The water is all fresh. There are a number of small lakes and a large creek running around the southwest and the north parts of the township. There are no water-powers and the land is not liable to be flooded. The climate is delightful and salubrious and summer frosts are

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 1—Continued.*

rare. There is plenty of wood for fuel. No coal nor lignite have yet been discovered, neither stone quarries nor other valuable minerals. Deer, moose, mink, muskrats, rabbits, foxes and coyotes are numerous.—*M. W. Hopkins, D.L.S., 1907.*

*Range 2.*

1. The surface of the township as a whole is undulating prairie. The nearest railway station is Medicine Hat, about one hundred miles by trail to the north. The soil as a whole is third class, being a gravelly loam or gumbo, except along the south boundary where the drying up by ditches and extreme drought of the extensive bed of Wildhorse lake has left a small area of land which is used as hay meadow and could be profitably cultivated. The township in the main however, is adapted to horse ranching which is largely carried on at present, some ranches having as much as thirty miles in pasture. There is no timber of any description in the township, the settlers having to procure their wood for building, fencing, &c., from the Eagle hills, about thirty miles to the north. Hay grows, as remarked above, in the low land surrounding Wildhorse lake on the south boundary of the township and also, I believe, in a few shallow meadows throughout the township, but owing to the extremely hot winds of this year, no hay was put up, not even around Wildhorse lake. During the past summer drinkable water was obtained only in an occasional well or spring, and also in a few pot-holes in the creeks during the first part of the season, but this was of a strong alkaline or soda nature. The water in the lakes and creeks is of such a muddy consistency that only animals can drink it. I kept one team for the purpose of drawing water which had to be brought from five to seven miles. I am told however, that in some years the supply of water in Sage creek which passes through the township and also in Wildhorse and Milk River lakes, is ample and good, particularly after a few years of heavy snowfall and rains. There are no water-powers. The climate is hot with dry winds during the months of June, July and August and the temperature averages from 90° to 100° Fahrenheit. There were no summer frosts during the survey (July). The residents procure their firewood from Eagle hills, thirty miles north, but I am told that there is an undeveloped seam of lignite about the eastern boundary which has been tried, but with indifferent results. Outcroppings of a loose sandstone appear in places along Sage creek, but it does not appear to have been used or developed. No minerals were seen or heard of. Bands of antelope were occasionally seen, also a few sage fowl and ducks were noticed.—*A. Driscoll, D.L.S., 1908.*

2. This township was reached by a good wagon road from Medicine Hat, about ninety miles to the north. The soil is a sandy, gravelly loam with occasional gumbo and is suitable mainly for grazing. The surface is slightly rolling prairie destitute of any timber. No hay had been cut this year but in wet years hay can be secured by cutting the prairie grass. Sage creek entering at the northwest corner of the township and flowing southeasterly had alkaline water in pools only (in July), but in ordinary years I am told it contains an abundance of water. A small creek at the northeast corner of the township also had water in pools. There are no water-powers in the township. The climate is dry, with no indications of early frosts. Fuel is brought from Eagle hills, about thirty miles north, where spruce timber is abundant. No lignite, coal, stone quarries or minerals were seen or heard of. Game, in the shape of antelope and jack-rabbits is fairly plentiful, but no other kind of game was seen.—*A. Driscoll, D.L.S., 1908.*

3. (North and east outlines.) The country crossed by this line is reached by a good wagon road from Medicine Hat, the nearest railway town, to the north, distant about seventy-five miles. The soil is of a gravelly or gumbo nature, suitable only for

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 2—Continued.*

grazing purposes. The surface is an undulating to rolling prairie, destitute of timber of any kind. Hay is scarce at any time owing to the dry nature of the country. Good water was found in pools in Bare creek at the northeast corner of this township and of a muddy consistency in Sage creek, about twelve miles west. There were no water-powers. The climate at any time is dry, but during the past season was exceedingly so during the summer months. No frosts occurred. Fuel is found in the Eagle hills to the north, about twenty miles distant, but no lignite, coal, stone or minerals were found. Game, in the shape of antelope was plentiful; also a few ducks were seen.—*A. Driscoll, D.L.S., 1908.*

4. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about eighty miles to the north. The soil is a sandy gravel with occasional gumbo and suitable for grazing purposes. The surface is rolling prairie with no timber of any description. Hay is obtained only by cutting the prairie grass. Water can be found only at the northeast and southwest corners of the township, where Lodge and Willow creeks are located. The water of these creeks is of good quality but no water-powers exist. The climate is dry, with no indication of summer frosts. Fuel is brought from Eagle hills where spruce timber abounds, but no lignite or coal is found, neither stone quarries or minerals. Antelope is plentiful and a few prairie-chicken and ducks were seen.—*A. Driscoll, D.L.S., 1908.*

5. This township is reached by good trails or wagon roads from Medicine Hat, the nearest railway station, about seventy-five miles north. The soil as a whole is a gravelly loam suitable only for grazing purposes, but in the valley of Lodge creek where there are springs for irrigation purposes and where the soil is somewhat better, good sized areas are brought under hay fields. The surface is a rough prairie destitute of timber of any description. A small quantity of hay is grown on irrigated lands and a certain amount is cut on the open prairie during wet years. Water of a good quality can be had from Lodge creek which runs diagonally through the township from the northwest corner. This creek is about twenty-five feet wide between banks, and when full would have a rapid current; it was very low, however, at the time of the survey (June). The climate is dry, with no sign of frost during the months of June, July, August and September. Fuel in the shape of timber can be had from Eagle hills, about fifteen miles to the north. Lignite or coal is not in evidence, neither stone quarries nor minerals. Game in the shape of antelope is plentiful and a few duck and prairie-chicken were seen.—*A. Driscoll, D.L.S., 1908.*

59. The best way to reach this township is from Vermilion or Kitscoty on the Canadian Northern railway by way of Frog lake and Cold lake wagon road, which is in very good condition. The soil consists of from two to three inches of rich loam with a clay subsoil. In parts of the township there is a layer of sandy soil between the loam and clay. The soil is suitable for general farming. The township is chiefly covered with the usual aspen or so-called poplar with some beech, and scattered spruce in the swampy ground. No valuable timber is found. There are a number of small lakes and Thompson lake, four miles long and one mile wide, on the north boundary of the township in sections 32, 33, 34 and 35. The water is all pure, fresh and permanent. There are no water-powers and the land is not liable to be flooded. The climate is fine and summer frosts are rare. There is plenty of wood for fuel, but coal or lignite has not yet been discovered, neither stone quarries, nor other valuable minerals. Fish, deer, moose, foxes, mink, bear, rabbits and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

60. This township can be easily reached from Kitscoty or Vermilion on the Canadian Northern railway by way of Frog lake and Cold lake wagon road which

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 2—Continued.*

runs across it. The soil consists of from two to eight inches of loam with good clay subsoil suitable for general farming. The surface is covered with the usual aspen or poplar with scattered spruce and a few birch. There is not much hay marsh. There is an abundance of good fresh water, all of which is pure. Thompson lake on the south boundary is four miles long and one mile wide. There are no water-powers and the land is not liable to be flooded. The climate is delightful and salubrious. There is plenty of wood for fuel. Coal or lignite has not yet been discovered in this township. No stone quarries or other valuable minerals were noticed. Deer, moose, mink, muskrat, foxes, rabbits, bear and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

*Range 3.*

1. From Medicine Hat, the nearest railway station, about one hundred miles north there are good trails or wagon roads. The soil is a gravelly loam and gumbo, which grows a nutritious grass favourable for range cattle and horses, but it is too dry and hard for agriculture. The surface of the country is undulating to hilly in the south. No timber of any description was found. Hay is very scarce and none was put up during last summer. Shallow meadows are to be seen which no doubt in wet years yield abundance of hay, but during the past year these meadows were hardly discernible. Water for drinking purposes was only to be had from the wells sunk by the ranchers, but the western end of Milk River lake barely crosses the eastern boundary of this township and the stock come through to drink. Both the lake and the wells are strongly impregnated with alkali. There are no water-powers. The climate is hot with dry winds which seem to preclude summer frosts. Fuel in the shape of spruce timber can be had from Eagle hills, about thirty-five miles to the northeast. No coal or lignite was seen or heard of. Stone in the shape of loose sandstone appears in the southern portion of this township, but it is doubtful whether it could be developed sufficiently for commercial purposes. No minerals were seen or heard of. Game in the shape of antelope is plentiful but that was the only kind seen.—*A. Driscoll, D.L.S., 1908.*

2. This township is reached by a good wagon road from Medicine Hat, the nearest railway station, about seventy-five miles north. The surface is a rolling prairie suitable for grazing, and the soil is a sandy gravel loam with occasional gumbo. No timber of any description is to be found in this township. Sage creek, crossing the northeast corner of this township, contains some pools fed by springs which supply good water. No other water was found. In wet years Sage creek contains an ample supply of water during the whole season. The climate is dry, as evidenced by the small growth of grass, and no hay was put up this year. Summer frosts were not experienced. Fuel is to be had from the Eagle hills in the shape of spruce timber, about twenty-five miles distant. No lignite or coal was seen, neither any stone quarries or minerals. Game in the shape of antelope is plentiful, also a few sage fowl were noticed.—*A. Driscoll, D.L.S., 1908.*

3. (North and east outlines.) The country crossed by this line is reached by a good wagon road from Medicine Hat, the nearest railway town to the north, distant about seventy-five miles. The soil is of a gravelly or gumbo nature suitable only for grazing purposes. The surface is an undulating to rolling prairie destitute of timber of any kind. Hay is scarce at any time owing to the dry nature of the country. Good water was found in pools in Bare creek at the northeast corner of township 3, range 2, and of a muddy consistency in Sage creek, about twelve miles west. There were no water-powers. The climate at any time is dry but during the past season was

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 3—Continued.*

exceedingly so during the summer months. No frosts occurred. Fuel is found in the Eagle hills to the north, about twenty miles distant, but no lignite, coal, stone or minerals were found. Game in the shape of antelope was plentiful; also a few ducks were seen.—*A. Driscoll, D.L.S., 1908.*

4. This township is reached by a good wagon road from Medicine Hat, the nearest railway station, about eighty miles north. The soil is a sandy gravel loam with occasional gumbo. The surface is a rolling prairie suitable only for grazing. There is no timber in the township nor hay land. Bare creek, flowing diagonally through the township from northwest to southeast, affords good water, though only in pools at the time of the survey (June). There are no water-powers. The climate is dry, as evidenced by the vegetation, and there were no signs of summer frosts. Fuel can be obtained in the shape of spruce timber from the Eagle hills, about twenty miles to the north. No coal or lignite was heard of, neither stone quarries nor minerals. Antelope were plentiful and a few prairie-chicken and ducks were seen.—*A. Driscoll, D.L.S., 1908.*

5. This township was reached by a good wagon road from Medicine Hat, the nearest railway station, about seventy-five miles north. The soil is a sandy loam, mixed with gravel in places, also spots of gumbo. It is well adapted for stock raising. The surface is rolling prairie destitute of timber of any description. The drouth this year apparently prevented the ranchers from putting up any hay. Bare creek flows diagonally through the township southeasterly, and also Willow creek, flowing through sections 25, 35 and 36 affords this township a good supply of pure water; both creeks were, at the time of survey (June), very low, but I understand that as a rule they contain a large supply of running water, but without anything in the shape of water-powers on them. The climate is dry, as evidenced by the vegetation, and no summer frosts were experienced. Wood is obtained from the Eagle hills about fifteen miles north, but no coal or lignite is found in the vicinity. Stone quarries or minerals were not seen or heard of. Game in the shape of antelope is plentiful, also a few ducks and prairie-chicken.—*A. Driscoll, D.L.S., 1908.*

59. The best way to reach this township is from Kitscoty or Vermilion on the Canadian Northern railway, by way of Frog lake and Cold lake wagon road, which is good all the way and passes right through the township. The soil consists of from two to six inches of rich loam with a good clay subsoil and is suitable for general farming. The surface is covered with the usual aspen trees, with a few birch and scattered spruce around the lakes and swampy places. There is not much hay marsh. There are a number of small lakes and two large ones, Reita lake in the northwest part, five miles long by three broad, and Cushing lake extending into the southwest part in sections 5 and 6. The water is all pure, fresh and permanent. There are no water-powers and the land is not liable to be flooded. The climate is delightful and summer frosts are rare. There has been no coal or lignite discovered yet, neither stone quarries nor other valuable minerals. Fish, deer, moose, foxes, mink, bears, rabbits and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

60. The best way to reach this township is from Vermilion or Kitscoty on the Canadian Northern railway, by a good road that passes through it from Frog lake to Cold lake. The soil is a rich loam two to four inches deep, with clay subsoil, suitable for general farming. The surface is covered with poplar or aspen trees, making good fuel, and there is sufficient spruce for buildings for settlers. No valuable timber occurs in sufficient quantity for commerce. There are small patches of natural hay



## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 3—Continued.*

growing around the sloughs. There is an abundance of permanent good fresh water. All the water in this section of the country is good and fresh. There are numerous small creeks and small lakes, with three large lakes in, or partly in, the township. The land is not liable to be flooded. There are no water-powers. The climate is mild and good and summer frosts are not usual. There is plenty of wood for fuel but no coal or lignite beds were exposed. No stone quarries were discovered nor any valuable minerals. There is an abundance of fish in the lakes and an occasional deer, moose or bear roaming around. Many fur-bearing animals as foxes, mink and coyotes are found.—*M. W. Hopkins, D.L.S., 1907.*

*Range 4.*

1. This township is reached by a good trail from Medicine Hat, the nearest railway town, about one hundred miles to the north. The soil is a gravelly loam and gumbo, suitable only for producing grass for grazing purposes. The surface of the country is prairie, entirely destitute of timber with the exception of a few cottonwood trees growing in the valley of Milk river, situated at the southwest corner of this township. With this exception timber for fuel is brought from Eagle hills, about thirty-five miles to the northeast. No coal or lignite was seen. Hay this year was very scarce, none having been put up, as the meadows were all dry. Water of good quality is to be had from Milk river, which touches the south boundary of this township in section 6, and also from springs at the northwest and southeast corners of the township. Lost river, which runs diagonally through this township in a southeasterly direction, contains a small quantity of water in shallow pools, but it is not fit for drinking purposes except by cattle. There are no water-powers. The climate during the summer season is very dry and hot, with no signs of summer frosts. Fuel is had from Eagle hills, some thirty-five miles to the northeast, and lignite and coal is not in evidence, neither stone quarries or minerals. Game in the shape of antelope is fairly plentiful.—*A. Driscoll, D.L.S., 1903.*

2. This township is reached by a good trail from Medicine Hat, the nearest railway station, about ninety miles north. The soil is a gravelly loam and gumbo, which grows good range grass, but is too hard and dry for agriculture. The surface is gently rolling prairie, and is destitute of timber of any description. Hay during wet years, no doubt, is to be had, but anything in the shape of meadow is at present dried up. Water was only had this year in a spring at the southwest corner of the township; all creeks were dry and there were no water-powers. The climate is exceedingly dry, with hot winds throughout the months of July, August and September, and there were no indications of frosts during those months. Fuel, in the shape of spruce timber, is to be had at Eagle hills, about twenty-five miles to the northeast; no indications of coal or lignite were seen, nor any stone or minerals. Game, in the shape of antelope, was fairly plentiful, but no other kind was seen.—*A. Driscoll, D.L.S., 1908.*

3. (East outline.) The country crossed by this line is reached by a good wagon road from Medicine Hat, the nearest railway town to the north, distant about seventy-five miles. The soil is of a gravelly or gumbo nature, suitable only for grazing purposes. The surface is an undulating to rolling prairie, destitute of timber of any kind. Hay is scarce at any time owing to the dry nature of the country. Good water was found in pools in Bare creek at the northeast corner of township 3, range 2, and of a muddy consistency in Sage creek, about twelve miles west. There were no water-powers. The climate at any time is dry, but the past season was exceedingly so during the summer months. No frosts occurred. Fuel is found in the Eagle hills to the



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 4—Continued.*

north, about twenty miles distant, but no lignite, coal, stone or minerals were found. Game, in the shape of antelope, was plentiful; also a few ducks were seen.—*1. Driscoll, D.L.S., 1908.*

4. A good wagon trail leads from Medicine Hat to Archer's ranch, situated in section 26 of this township. There is another trail by way of Eagle Butte postoffice, but while this is in good condition from Medicine Hat to Eagle Butte, it is rough and not well marked from Eagle Butte to Archer's. The prevailing kind of soil is a light coating of sandy loam with gumbo subsoil. In the bad lands, of which there is considerable in this township, the soil is mostly gumbo, on which there is little vegetation except a species of vine cedar, which in places grows quite thickly. The soil is not good for agriculture unless irrigated, though along Sage creek some vegetables and a little grain have been grown. This township is most suitable for grazing, the grass, especially in the northeastern part, being quite thick but brown and dry, though stock seem to thrive well on it. There is great lack of water. There is no spring in the township, nor any sloughs containing any quantity of water, and Sage creek is small and dries up during the summer. At Archer's ranch good cold water was obtained by digging. The surface is rolling prairie with some very deep ravines, the northwestern part being almost entirely bad lands. The general slope from both eastern and western boundaries is towards the centre, veering towards the southeast as the southern boundary is approached. There is no timber. The sloughs and creeks are alkaline. Good water can be obtained by digging near Sage creek. There is not sufficient for water-power or irrigation, nor is there any danger of flooding. The climate is very dry during the greater part of the summer, though during the latter part of May and the early part of June there is generally abundance of rain. Hot, scorching winds prevail during the summer. The air is very clear and bright. Summer frosts are not common, and cold winds from the north are prevented a great deal by the Cypress hills. Fuel is very scarce. Wood can be obtained only at the Cypress hills, about twenty-five miles distant. There are no stone quarries, but coal can be obtained in the adjoining township. There are two outcroppings of very poor quality showing in the western part of the township. There are a few antelope and numerous coyotes, gophers and jack-rabbits. A few sloughs are found which, in general, do not supply the ranchers with sufficient hay. A slough is cut about once in three years. In dry years hay is very scarce.—*A. G. Stacey, D.L.S., 1908.*

5. A good wagon trail leads directly from Medicine Hat to McLean's ranch in section 21 of this township. Another trail leads from Medicine Hat to Eagle Butte and thence to McLean's, but the latter is rough and not clearly defined besides being a good many miles longer. The soil is mostly a sandy loam with gumbo subsoil. The northwestern portion is mostly bad lands. The eastern and northeastern part of this township would be suitable for agriculture if it were irrigated but it is too dry in its present state to grow grain. The grass is quite good here, but brown and dry, though stock seem to thrive well on it. The surface is mostly rolling prairie with a slope from eastern and western boundaries towards the basin of Sage creek. There are some very large ravines. Sage creek rises in the bad lands in the northwestern part of the township. There is no timber, but there are a few good sloughs in the northeastern part of the township which generally provide sufficient hay for the ranchers though in dry seasons hay is very scarce. Lack of good water is a great drawback to this township. The sloughs do not contain water during the summer and Sage creek dries up. Water can be obtained by digging near Sage creek. There is not sufficient for water-power or irrigation nor is there any danger from flooding. The climate is very dry with scorching winds during the summer. As a general rule there

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 4—Continued.*

is a season of very wet weather during the latter part of May and the early part of June. There are no summer frosts. Wood cannot be obtained nearer than the Cypress hills twenty-five miles distant and this I believe has been lately made a reserve. Fuel can be obtained in the adjoining township. There are no stone quarries nor minerals. There are some antelope, numerous coyotes, gophers and jack-rabbits.—*A. G. Stacey, D.L.S., 1908.*

59. The best way to reach this township is from Kitscoty or Vermilion on the Canadian Northern railway by Frog lake and Cold lake wagon road. This is a good road and passes a couple of miles to the east. There are newer trails from there to this township. The soil is composed of two or three inches rich loam and a clay subsoil. In parts of the township there are layers of sand under the loam where there formerly have been beds of creeks or lakes. The east and south quarter sections of the township are covered with the usual aspen trees with birch, scattered spruce and tamarack in the swamps, while the northwest quarter contains some very valuable spruce and tamarack timber. Very little natural hay meadow is found. There are a few small lakes and Reita lake, five miles long by three wide, extends into the east side of the township. All water is pure, fresh, good and permanent. There are no large streams nor water-powers and the land is not liable to be flooded. The climate is excellent and summer frosts are rare. There is plenty of wood for fuel but no coal nor lignite has been discovered, neither stone quarries nor other valuable minerals. Fish, deer, moose, foxes, rabbits, mink, bear and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

60. The best way to reach this township is from Kitscoty or Vermilion on the Canadian Northern railway by Frog lake and Cold lake wagon road which passes four or five miles to the east of the township, from which there is a trail passing into the township. This wagon road is very good. The soil consists of from two to eight inches of rich loam overlaying a clay subsoil, and is suitable for general farming. The surface is covered with the usual aspen or poplar with a few birch and scattered spruce. However, in sections 5, 6 and 7 there is very valuable large spruce timber. Very little hay marsh occurs. There are many little lakes containing pure, fresh water of permanent supply. The cheapest fuel is wood of which there is an abundant supply. No coal or lignite is known to exist. No stone quarries nor other valuable minerals have yet been discovered. Deer, moose, foxes, muskrats, mink, bears, rabbits and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

*Range 5.*

3. (East outline.) The country crossed by this line is reached by a good wagon road from Medicine Hat, the nearest railway town, to the north, distant about seventy-five miles. The soil is of a gravelly or gumbo nature, suitable only for grazing purposes. The surface is an undulating to rolling prairie destitute of timber of any kind. Hay is scarce at any time owing to the dry nature of the country. Good water was found in pools in Bare creek at the northeast corner of township 3, range 2, and of a muddy consistency in Sage creek, about twelve miles west. There were no water-powers. The climate at any time is dry, but during the past season was exceedingly so during the summer months. No frosts occurred. Fuel is found in the Eagle hills to the north, about twenty miles distant, but no lignite, coal, stone or minerals were found. Game in the shape of antelope was plentiful; also a few ducks were seen.—*A. Driscoll, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 5—Continued.*

4. A good wagon road leads directly from Medicine Hat to the south part of township 5, range 5; from there a branch road leads through the centre of this township to Penland's ranch on Ketchum creek in section 11. The soil in the western half of this township is sandy loam with gumbo subsoil, and if irrigated it would be suitable for agriculture. The eastern portion is mostly bad lands at the southern part, becoming largely a gumbo flat. The grazing in the western part is good, but in the remainder grass is very scarce. The surface is gently rolling. One mile south of the north boundary is a height of land sloping north to the south branch of Manyberries creek and south to Ketchum creek. The northeastern part is bad lands, and the southeastern part is gumbo flat. There is no timber and there is very little hay. In a wet season some can be cut in the western half of the township. There are no large sloughs, consequently the supply is limited and the quality is quite inferior. Ketchum creek passes through this township. It is not a running stream during the summer, but keeps enough water in pools to supply the needs of stock. The water is quite alkaline. There is no danger of flooding. There is not sufficient water to develop any kind of water-power, but Mr. Penland is having dams constructed to retain the surplus of freshet water for watering stock in summer. The climate is as a rule very hot and dry, with high, scorching winds. There is abundance of rainfall during the latter part of May and the early part of June. The winter is very cold, and stock suffer severely for want of shelter. There are no summer frosts. Wood can be obtained only at the Cypress hills, thirty-five miles distant. Coal can be obtained in this township in the northeastern part, though the quality at the present depth is not good, and coal is mostly brought from a mine in township 3, range 3. There are no stone quarries, but there is some coal. Some antelope and numerous coyotes, gophers and jack-rabbits were seen.—*A. G. Stacey, D.L.S., 1908.*

5. A good wagon road leads from Medicine Hat to McLaren's ranch in section 21, township 5, range 4, and thence in a southwesterly direction to the southern sections of this township. The soil in the northern and eastern part of this township is almost entirely bad lands, with very little vegetation. The western sections are more loamy with gumbo subsoil and much broken by watercourses. It is not suitable for agriculture unless irrigated and even then the gumbo in the soil holds the water on the surface, preventing it from getting to the roots of vegetation. The soil is more suitable for grazing than anything else, but the grass in this township is very poor. The surface is mostly gently rolling prairie, but in the northern part it is rough and hilly with large ravines and a large extent of bad lands. There is no hay to be obtained in this township and no timber. There are two branches of Manyberries creek in this township. The north branch enters the northwest corner of the township and the south branch crosses the south boundary. The water in the north branch is good, and remains in pools in the river nearby all the year round, but the south branch contains very little water and dries up during the summer. There is not sufficient water for water-power or irrigation nor is there any danger from flooding. The climate is very hot and dry, with scorching winds. As a general rule there is plenty of rain during the latter part of May and the early part of June, but very dry during the rest of the year. The winter is cold, with high winds from which there is little protection. Snow does not fall to a great depth. There are no summer frosts. Wood can be obtained only at the Cypress hills about thirty miles distant. Coal of inferior quality can be obtained in the adjoining township. There are no stone quarries nor minerals. Some antelope, coyotes, gophers and jack-rabbits were seen.—*A. G. Stacey, D.L.S., 1908.*

59. This township can be reached from Vermilion, on the Canadian Northern railway, by the ferry to St. Paul de Metis, thence to the Kebeewin Indian reserve, which

## TOWNSHIP'S WEST OF THE FOURTH MERIDIAN.

*Range 5—Continued.*

adjoins this township. All the roads are good. The soil is from four to seven inches of rich loam with clay subsoil suitable for general farming. The surface is covered with aspen, birch and scattered spruce. The north half of the township is taken up by Muriel lake. There is no valuable timber for commerce except possibly along the east side extending from the valuable timber area in the adjoining township. The only hay areas are in the sloughs, as the township is covered with woods. All the water, of which there is an abundance, is fresh, good and permanent; there are no large streams, but Muriel lake takes up half the township. The land is not liable to be flooded. There are no water-powers in the township. The climate is delightful and summer frosts are not usual. Wood, of which there is a large quantity is the only kind of fuel in the township. No stone or other minerals were exposed. Fish, deer, bear, foxes, muskrats, mink and moose are numerous.—*M. W. Hopkins, D.L.S., 1907.*

60. The most convenient way to reach this township is from Vermilion, on the Canadian Northern railway, by way of St. Paul de Metis and the Keheewin Indian reserve. A good road extends all the way. The soil consists of from two to five inches of rich loam, underlaid by clay. In places there is a layer of sand between the loam and clay, where formerly creeks or other running water has flowed. It is suitable for general farming. The surface is covered with the usual aspen trees with some birch and scattered spruce around swamps. However in section 24 there is some valuable spruce timber. There is not much hay marsh. Muriel lake takes up the southern half of the township and there are other small lakes. All the water is pure, fresh and permanent. Muriel creek flows out of Muriel lake across sections 23, 25, 36 and 35. There are no water-powers and the land is not liable to be flooded. The climate is charming and summer frosts are rare. The cheapest fuel is wood, which is abundant. No coal nor lignite has been discovered, neither stone quarries nor other valuable minerals. Fish, deer, moose, foxes, mink, muskrats, rabbits and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

61. This township can be reached from Vermilion, on the Canadian Northern railway, by the St. Paul de Metis wagon road to Cold lake, which passes through it. The soil consists of from three to eighteen inches of rich loam, with a good clay subsoil, suitable for general farming. The surface is covered by the usual aspen or poplar except in the extensive hay marshes, which extend across the township from section 25 to section 18, and along Muriel creek and the north shore of Charlotte lake. This is very valuable hay land. Being covered with water part of the year, it is continually fertilized and yields a very large quantity of good hay. There is an abundance of good, fresh and pure water. The only land that is liable to be flooded is the hay land above referred to. There are no water-powers in the township. There is an abundance of wood for fuel. Coal or lignite has not yet been discovered, neither stone quarries nor other valuable minerals. Fish abound in large quantities in the two large lakes in the southern part of the township, while deer, moose, bear, mink, rabbits, muskrats and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

62. This township can be most conveniently reached by way of St. Paul de Metis from Vermilion, on the Canadian Northern railway. The soil consists of from two to ten inches of rich loam with clay subsoil suitable for general farming. The surface is covered with a growth of aspen, birch and scattered spruce. The aspen is everywhere on the high, dry ground, the birch in damp places, and the spruce in the swamps. There is very little natural hay lands, which are only in the sloughs. There are large quantities of good fresh water in the lakes. Beaver river, which runs across the north

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 5—Continued.*

ern part of the township is from two to three chains wide and over six feet deep in places. All water is good and fresh. The land is not liable to be flooded. There are no very valuable water-powers at present but Beaver river can be dammed up in places so as to be utilized for power. The climate is very delightful and summer frosts are not usual. The only fuel within the limits of the township is wood which is abundant. No stone quarries or other valuable minerals were noticed. Fish are plentiful while deer, moose, foxes, mink, bear and coyotes are numerous.—*M. W. Hopkins, D.L.S., 1907.*

*Range 6.*

59. There is a good road from Vermilion on the Canadian Northern railway by way of St. Paul de Metis and Keheewin Indian reserve to this township. The soil consists of about six inches of rich loam with clay subsoil, and is suitable for general farming. The surface is covered with aspen trees with park-like openings in places and is very beautiful, bordering on Jones lake across the north boundary of the township. This lake, however, is alkaline to the taste, but not so much that it cannot be used for drinking. It is the only alkaline lake for many miles around, as all water is pure, fresh and good. There is much hay land around this and other lakes but there is no valuable timber beyond what is required by the settlers. There are no large streams or water-powers and the land is not subject to flooding. The climate is delightful and summer frosts are rare. There is plenty of wood for fuel. No coal or lignite has been found, neither stone quarries nor other valuable minerals. Fish, deer, moose, foxes, rabbits, muskrats, mink and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

60. The best route by which to reach this township is from Vermilion on the Canadian Northern railway by the St. Paul de Metis and Cold lake or Moose lake wagon road, which is good all the way. The soil consists of from two to twelve inches of rich loam with a good clay subsoil, suitable for general farming. The surface is covered with the usual aspen or poplar with a few birch and scattered spruce in the swampy places. There is no valuable timber and not much natural hay. There are a number of small fresh water lakes and two large ones. Moose lake in the northwest part is fresh water and Jones lake in the south side of the township is somewhat alkaline, but not enough to make it undrinkable. There are no water-powers and the land is not liable to be flooded. The climate is delightful and salubrious. Summer frosts are rare. There is an abundance of wood for fuel and building purposes, but coal or lignite has not yet been discovered in this township. No stone quarries nor valuable minerals have been found. Deer, moose, fish, foxes, muskrats, rabbits, mink, coyotes and bear are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

61. The best way to reach this township is from Vermilion on the Canadian Northern railway by way of St. Paul de Metis and Cold lake wagon road, which is in good condition all the way. The soil consists of from three to ten inches of rich loam with clay subsoil suitable for general farming. The surface is covered with the usual aspen or poplar, with scrub in places. There is no valuable timber and only a few hay marshes in the east side of the township. The water is all fresh. There are a number of small lakes and two large ones. From the southwest corner of the township Moose lake juts into the centre and Jessie lake extends into the southeast part from range 5. There are no water-powers and the land is not liable to be flooded. There is plenty of wood for fuel but no coal, lignite, stone quarries nor other valuable minerals have been discovered yet. Fish, deer, moose, foxes, mink, bear, muskrats, rabbits and coyotes are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 6—Continued.*

62. This township can be most easily reached from Vegreville or Vermilion on the Canadian Northern railway by the St. Paul de Metis and Moose lake wagon road which passes near the township and is a very good road. The soil consists of from two to eighteen inches of rich loam with a good clay subsoil suitable for general farming. The surface is covered by the usual aspen or poplar with scattered spruce in the low ground. There is some hay marsh on the east side of the township. There is an abundance of fresh, pure water. Beaver river runs across the township from section 30 to section 25. It is from two to three chains wide and is about six feet deep in places. It has many little rapids that might be dammed so as to be utilized for power in small quantities. There is an abundance of wood for fuel but no coal nor lignite has yet been discovered in the township. No stone quarries nor other valuable mineral deposits are known to exist. Deer, moose, mink, muskrat, foxes, bear and fish are plentiful.—*M. W. Hopkins, D.L.S., 1907.*

*Range 7.*

3. This township is reached by a good wagon road from Medicine Hat, the nearest railway town about one hundred miles to the north. The soil is a sandy loam and is adapted to grazing purposes. The surface is an undulating prairie destitute of any timber. Hay is obtained in ordinary years along the shores of Pakowki lake but this season was so dry that none was harvested. Manyberries creek near the northeast corner which had good water in pools supplies drinking water, besides which the only water in the township is in Pakowki lake and it is fit only for animals. There are no water-powers. The climate is dry with no indications of summer frosts. Fuel in the shape of spruce timber can be obtained from Eagle hills, about thirty-five miles to the northeast, and also a small quantity of cottonwood along Milk river about ten miles south. No coal, lignite, minerals or stone quarries were seen. Antelope, duck and jack-rabbits are fairly plentiful.—*A. Driscoll, D.L.S., 1908.*

4. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about seventy-five miles to the north. The soil varies from sand, sandy loam to clay and gumbo and is particularly adapted to grazing, being in the vicinity of the larger water area, Pakowki lake. The surface of the ground is an undulating prairie with no timber whatever. Hay in ordinary wet years is plentiful along the shores of Pakowki lake, but there was none harvested this year. Water can be had only in Pakowki lake and is fit only for animals. No water-powers are in the township. The climate is dry with no summer frosts. Fuel is had from the spruce timber on Eagle hills about thirty-five miles to the northeast and also from a limited amount along Milk river. Coal, lignite, minerals and stone quarries were not seen. Of game there was antelope, duck and jack-rabbits in fair quantities.—*A. Driscoll, D.L.S., 1908.*

5. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about ninety miles to the north. The soil is a sandy loam with occasional gumbo and is most suitable for grazing purposes. The surface is an undulating prairie without any timber. Hay in fairly wet years is plentiful along the shores of Pakowki lake, but there was none during the past season on account of the drouth. Water of fair quality was found in pools in Manyberries creek which empties into Pakowki lake. The lake itself, however, is of a strongly alkaline or soda nature and the water is used only for animals. No water-powers were found. The climate, judging by the past season, is dry with no indications of summer frosts. Fuel can be had from Eagle hills to the northeast in the shape of spruce timber and



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 7—Continued.*

also a small quantity of poplar and cottonwood from the valley of Milk river, about twenty miles south. No lignite, coal, stone quarries or minerals were seen. Antelope were fairly plentiful, also ducks and jack-rabbits.—*A. Driscoll, D.L.S., 1908.*

*Range 8.*

3. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about one hundred and ten miles north. The soil is a sandy loam adapted for grazing purposes. The surface is a rolling prairie destitute of timber. There was no hay this year. Water fit for animals only, and strongly alkaline or soda, can be had from Pakowki lake in this township. There are no water-powers. The climate is dry with no summer frosts. Spruce timber for fuel is obtained from Eagle hills, about forty miles to the northeast, and also some cottonwood and poplar from Milk river, about ten miles to the south. There are no minerals, coal, lignite or stone quarries. Antelope, duck and jack-rabbits are plentiful.—*A. Driscoll, D.L.S., 1908.*

4. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about one hundred and ten miles north. The soil is a sandy loam adapted to grazing purposes. The surface is rolling prairie destitute of timber. There was no hay this year. Water fit for animals only, and strongly alkaline or soda, is obtained from Pakowki lake, situated in the northeast portion of the township. No water-powers were noticed. The climate is dry with no summer frosts. Spruce timber for fuel can be had from Eagle hills, about forty miles to the northeast, and also a small amount of cottonwood is found on Milk river, about ten miles to the south. No coal, lignite, minerals, or stone quarries were seen. Antelope, duck, and jack-rabbits were fairly plentiful.—*A. Driscoll, D.L.S., 1908.*

5. This township is reached by a good wagon road from Medicine Hat about one hundred miles to the north. The soil is a sandy loam suitable for grazing purposes. The surface is a rolling prairie destitute of timber. On account of the drouth this season there was no hay. Pakowki lake which takes up the southern half of the township affords the only water available, and that is fit only for animals, as it is strongly alkaline. The climate is dry with no summer frosts. Spruce timber for fuel can be obtained from Eagle hills about thirty miles to the northeast. No coal, lignite, minerals or stone quarries were found. Antelope, duck and jack-rabbits are fairly plentiful.—*A. Driscoll, D.L.S., 1908.*

*Range 9.*

3. This township is reached by a good wagon road from Medicine Hat, the nearest railway town, about one hundred miles northeast. The soil is a sandy loam suitable for grazing purposes. The surface is a rolling prairie without any timber. Hay in ordinary years is to be had in large quantities along the shores of Pakowki lake but this year on account of the great drouth scarcely any was harvested. With the exception of Pakowki lake there is no water in the township and it is fit only for animals. There are no waterfalls or power. The climate, judging by the vegetation and the past season, is dry, but wet periods are also frequent. No summer frosts were experienced. Fuel can be obtained from Milk river where a small amount of cottonwood and poplar grows, also spruce from Eagle hills about forty miles northeast. No coal, lignite, stone quarries or minerals were seen or heard of. Antelope and ducks were fairly plentiful and a few prairie-chicken and jack-rabbits were seen.—*A. Driscoll, D.L.S., 1908.*



## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 9—Continued.*

4. This township is reached by a good wagon road from Medicine Hat, the nearest railway town about one hundred and ten miles north. The soil is a sandy loam suitable for grazing purposes. The surface is a rolling prairie destitute of timber. There was no hay put up this year as the season was too dry. Water fit for animals only is to be had in the township to the east but there is no water in this township. The climate was dry with no summer frosts. Spruce timber for fuel can be had in Eagle hills, about forty-five miles to the northeast. No lignite, coal, minerals or stone quarries were seen. Antelope, duck and jack-rabbits are fairly plentiful.—*A. Driscoll, D.L.S., 1908.*

5. This township is reached by a good wagon road from Medicine Hat, about one hundred miles to the north. The soil is a sandy loam adapted for grazing purposes. The surface is rolling prairie destitute of timber. There was no hay this year as the season was too dry. An arm of Pakowki lake extends from east to west through the township, receiving the water overflow from an irrigation ditch at its western end, keeping the lake shore fairly fresh and drinkable. The lake itself is alkaline. The climate is dry with no summer frosts. Spruce timber can be had for fuel from Eagle hills, about thirty-five miles to the northeast. No coal, lignite, minerals or stone quarries were seen. Antelope, duck and jack-rabbits are fairly plentiful.—*A. Driscoll, D.L.S., 1908.*

*Range 13.*

63. This township is reached by a wagon trail running northerly from the town of Vegreville, on the Canadian Northern railway. The trail passes through Saddle lake and Whitefish lake settlements continuing northerly through township 63, range 14 to Lac la Biche settlement. This trail from Vegreville to Saddle lake is travelled a great deal and is usually in good condition. From Saddle lake to Whitefish lake it is not so good, especially during wet weather. From Whitefish lake to Lac la Biche, it is usually very bad, there being a number of swampy places and hills of considerable size. The surface soil in this township for the most part is shallow loam, ranging from two to six inches in depth. This loam is mostly of a sandy nature. The subsoil is nearly all of a sandy clay nature, which in some places is quite stony. Besides those sections, in which the subsoil is of a stony nature, this township is fairly well adapted to agricultural purposes. It is however a soil which will be fairly hard to work. There are a number of small muskegs in the township, but there are none of large area. With the exception of sections 1 and parts of 2, 12, 36 and small patches along the north slope of Beaver river, this township is all heavily timbered. These portions of sections 1, 2, 12 and 36, which are more heavily timbered, are of a scrubby nature, consisting of small poplar and balm of Gilead, while the excepted portion along the northern bank of Beaver river, varies from small patches of open prairie to a scrubby growth of poplar. The bulk of the timber in this township is poplar, balm of Gilead and birch. There are also small areas of jackpine, while a scattering of spruce occurs throughout the entire township. The poplar and balm of Gilead range in diameter from two to sixteen inches, the birch ranging from about two to ten inches and in some cases fourteen. The spruce ranges from three to eighteen inches, while in section 24 there is a patch of spruce on Beaver river somewhat larger in size, ranging from six to thirty inches. A good deal of the best of this timber, however, has been cut out as there is a Government saw-mill located on this section where lumber is cut for the use of the Indians on the Whitefish Lake Indian reserve. The best of the birch in this township is found in sections 22, 15, 16 and 8. The poplar and balm of Gilead is found throughout the

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 13—Continued.*

entire high lands of this township and form the great bulk of the timber. Small quantities of hay may be cut from the flats on small patches of open country along the north bank of Beaver river. Considerable hay is also cut along the flats of Whitefish creek, which enters this township in section 3, flowing through the southerly portion of sections 4 and 5 into the lake of Bays. Besides these two sources very little hay is to be found in this township. There is, however, a considerable growth of peavine throughout scattered sections of the township. This makes the best of hay, when it can be cut, but owing to the timber nature of the country it will be almost impossible to cut any quantity of it here. This township is well supplied with fresh water, while, owing to the rolling nature of the surface, it is in little danger of being seriously flooded. All the water found in this township is fresh. Beaver river crosses the northerly portion of this township, entering section 30 and flowing through sections 30, 29, 28, 27, 26, 23 and 24. This stream varies in width from seventy-five to one hundred and fifty feet and flows through this township in a very deep valley ranging in width from one-half to one and one-quarter miles. This stream is from one to six feet deep, in some sections being quite shallow and rapid while in others it is deep and stagnant. The average flow of this river throughout this township is not more than one or one and a half miles per hour. Whitefish creek which flows through sections 3, 4 and 5, varies in width from fifty to one hundred feet and is from four to eight feet in depth with no perceptible current. A number of small streams are found throughout different sections of the township, but these are of little or no importance. No water-power is available in this township. The climate appears quite similar to that of the country farther south, but owing to the timbered nature of the country it was noted that the foliage remained green longer in the autumn than in those districts fifty or one hundred miles south. No summer frosts of importance were noted during the past season. Wood is the fuel most readily obtained in this township, and can be had in abundance any place. No coal or lignite veins are known to occur. No stone quarries nor minerals of economic value were located nor are any known to occur in this township. Black bear seem quite numerous throughout this township. Moose are also occasionally found, while along Beaver river jumping deer appear to be quite plentiful. Partridge are quite numerous, but prairie-chicken are very rarely seen.—*W. H. Waddell, D.L.S., 1908.*

64. This township is reached by a trail northerly from the town of Vegreville on the Canadian Northern railway. This trail passes through the settlements at Saddle lake and Whitefish lake, and terminates at lac la Biche. This trail passes through this township in a northerly direction, entering in section 1 and passing out of the township in section 34, from Vegreville to Saddle lake. This trail is in splendid condition throughout almost the entire year. From Saddle lake to Whitefish lake it is good during the dry and winter seasons but is bad in the early spring and summer. From Whitefish lake to lac la Biche it is bad throughout almost the entire year. During the spring, summer and autumn seasons it is badly cut up in numerous soft places, and is also broken by a number of very bad hills. The surface soil is of a black sandy loam nature, varying in depth from three to eight inches. The subsoil is for the most part of a sandy clay nature, and in scattered districts this is quite stony. Throughout the western section of the township there is a considerable number of muskegs, where the soil is of a marshy mucky nature, which in its present condition is unsuitable for anything. The high lands of the township, however, are apparently fairly well adapted to agricultural purposes. There are at the present time three settlers located in this township, but up to the present they have done very little farming. The westerly half

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 13—Continued.*

of this township is heavily timbered throughout; sections 1, 2, 11, 12, 13, 14, 24, 23, 25, 26, 27, 34 and 35 are for the most part timbered, but the bush is partly of a scrubby, second growth nature, while small patches of open country are found throughout. The westerly half of this township is timbered with poplar from four to twelve inches in diameter, balm of Gilead, of about the same size, while the muskegs and low lands are timbered with spruce and tamarack ranging from three to eight inches in diameter. A scattering of spruce is found throughout the higher portions of the township, ranging in size from six to eighteen inches. A small amount of birch is also found from one to eight inches in diameter. The timbered portions of the easterly half of this township consist of poplar and balm of Gilead averaging a great deal smaller in size but ranging from two to ten inches in diameter. There is also considerable willow scrub throughout the lighter timbered portions of the township. Considerable hay is cut on the flats around Duck lake and also around a small lake on section 10. There is also a quantity of hay cut on sections 32 and 33, on the flats of Little Beaver river. There are a number of small sloughs throughout this township where hay might be cut, but there are none of much importance. The hay which does occur, however, is all of good quality. The water of this township is all fresh and good and the supply is sufficient and permanent. Owing to the rolling nature of the country I do not think there is a serious danger from floods. Little Beaver river enters this township at section 31, flowing through sections 31, 32, 33, 25, 15, 14, 11 and 1. This river flows through a valley from fifty to seventy-five feet deep and from one-half to one mile in width the stream itself being from fifty to seventy five feet in width, the upper portion being of a stagnant nature from two to six feet in depth, with very little current, while the southerly portion of this township is of a more shallow nature, being from one to two feet in depth with a current from one to one and one-half miles per hour. A number of small creeks are found throughout the township but no streams except Little Beaver river are of any importance. No water-powers of value are found in this township. General indications point to a climate suitable for agricultural purposes. No summer frosts of any importance are known to have occurred in this township during the past season. Wood is the fuel most readily obtained, and may be found in abundance throughout the entire township. No coal or lignite veins are known to occur. No stone quarries nor minerals of economic value were found. Black bear are quite numerous in this township. A few moose are also found. Partridge appear to be quite plentiful, while prairie-chicken are very scarce.—*W. H. Waddell, D.L.S., 1903.*

*Range 14.*

27. This township is about sixty miles from Bassano, a station on the main line of the Canadian Pacific railway. A trail in good condition affords access to it. The soil is chiefly clay, suitable for general agricultural purposes, but a good deal of it rates only third class. The surface is rolling prairie without any timber. Bullpound creek traverses the township from section 36 to section 1. It was at one time a creek of considerable volume, but it is now only a chain of pools. The water is not good in many places, varying according to the nature of the adjacent soil. There is very little hay land. Climatic conditions are favourable, with no especial danger of summer frosts. Coal is available in several places within twenty miles. It is likely that coal may be found in this township, as it seems to underlie the adjacent district in several places. There are no stone quarries or minerals of economic value. Duck was the only game seen.—*Geo. Edwards, D.L.S., 1907.*

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 14—Continued.*

28. This township is accessible by trail from Gleichen or Bassano, stations on the main line of the Canadian Pacific railway. The soil is chiefly a very heavy clay or gumbo, unfit for cultivation, and for the most part not producing good grass. The surface is rolling prairie without any timber, except a few bunches of willow and scrub along Bullpound creek. There is very little hay land. The only water, other than a few sloughs, is in Bullpound creek. This was at one time, possibly not over twenty years ago, a stream of considerable volume, taking its rise in Handhills lake. This lake, in some way, became drained off, the level falling about twenty feet. As a consequence there is no longer any flow of water from the lake, and the creek is now merely a chain of pools without any current. The water is in some places good and in other places brackish and muddy, according to the nature of the adjoining soil. The climate is good and no special danger of summer frosts. Coal is available for fuel in the adjoining township west and will likely be found in this township as well. There are no stone quarries or minerals of economic value. A few ducks were seen along the creek but no other game was noticed.—*Geo. Edwards, D.L.S., 1907.*

29. This township can be reached by trail from Gleichen or Bassano. The soil is chiefly heavy clay or gumbo, not producing even good grass and most of it worthless for agricultural purposes. The surface is prairie with no timber. The southeast quarter of the township is intersected with deep coulées, while the remainder is level or slightly rolling. There is very little hay land. Bullpound creek traverses the township from section 32 to section 3. This was at one time a stream of considerable volume, having its source in Handhills lake, but owing to a fall of about twenty feet in the lake level, there is now no flow of water from it, and the creek is merely a chain of pools. The water in these pools is sometimes as deep as three or four feet, and is good in some places; in others, muddy and brackish. Climatic conditions are favourable. There is no especial liability to summer frosts. A seam of coal in a coulée on section 6 affords fuel supply to ranchers in this and the adjoining townships. Indications of coal were noticed at several points. There are no stone quarries or other minerals of economic value. A few ducks and prairie-chicken were the only game seen.—*Geo. Edwards, D.L.S., 1907.*

30. The most convenient route to this township is by a good trail from Gleichen. The soil is chiefly heavy clay and gumbo, very poor for any purpose. The surface is rolling prairie without any timber whatever. There is no hay land. Bullpound creek traverses the township, affording the only water supply. This creek has no current, being simply a chain of pools. The climate is good. Summer frosts are not prevalent. Coal can be obtained in the adjoining township west, and probably in this township also. There are no stone quarries or minerals of economic value. Ducks were seen along the creek but no other game.—*Geo. Edwards, D.L.S., 1907.*

31. This township can be reached by wagon from the town of Stettler, on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail, which is a fairly good road during the summer months except in a wet season. There are a few creeks and sloughs not yet bridged that are difficult to cross. The soil is generally sandy loam and clay loam; in some of the flats there is gumbo or stiff clay. The loamy soils are good for agricultural purposes. The surface is prairie with no timber worth mentioning. In a few of the sloughs there are a few small poplar, but they have been nearly all killed by prairie fires. Some of the sloughs are surrounded with small willow. A few small poplar are found around the sloughs but they are too small for building purposes. Considerable hay could be cut in the meadows throughout the township. The supply of water is very limited except in Bullpound lake in

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 14—Continued.*

sections 7 and 8, and in a dry season it would likely become very low. The water in the sloughs and in Bullpound lake is fairly good for domestic use. Good water can be obtained by digging. There are no water-powers in the township. The climate is inclined to be dry but subject to extremes of drought and moisture. This season was very wet during the month of June. Last season was the other extreme. There is no wood but lignite coal has been found in the adjoining townships, and will no doubt furnish a supply for settlers in this township. No stone quarries, minerals or mineral bearing rocks were found in the township but there is plenty of field stones. Wild duck and geese are very plentiful around the lakes and ponds. A few prairie-chickens and an occasional antelope were seen. Prairie wolves and small animals are not very plentiful. —*Lewis Bolton, D.L.S., 1908.*

32. This township can be reached by wagon by way of the Handhills trail from the town of Stettler on the Lacombe branch of the Canadian Pacific railway. This trail is fairly good during the summer months except in a wet season. There are a few creeks and sloughs not yet bridged that are difficult to cross. The soil is varied from sandy loam to clay and clay loam and suitable for agricultural purposes. The surface is prairie with a few poplar and willow bluffs surrounding some of the sloughs. The timber is of no account for building purposes and the quantity is very small. The northerly part of the township is very hilly, while the remainder is rolling. There is not much hay; a few small meadows are scattered through the township, but none of any great area. There are a few small lakes and sloughs. The water in the lakes is not fit for domestic use; that in most of the sloughs could be used, but they dry up early in the season. There are a few springs, the water supply being limited. Good water can be obtained by digging. No water-powers nor streams of any kind are found. The climate is inclined to be dry but subject to extremes of drought and moisture. No summer frosts occurred this season. There is very little wood. Lignite coal has been found in the adjoining townships and no doubt a sufficient supply can be obtained for the use of settlers in this township. Game is not plentiful except wild geese and duck on the lakes and sloughs; a few antelope and coyotes were seen among the hills. There are no minerals, mineral bearing rocks nor stone quarries, but plenty of field stone is found. This township is well adapted for grazing, the pasture being excellent among the hills but it is rather rough for grain growing.—*Lewis Bolton, D.L.S., 1908.*

63. This township is reached by a trail running northerly from the town of Vegreville, on the Canadian Pacific railway, to the settlement at lac la Biche. This trail is followed to a point about four miles northerly from the settlement at Whitefish lake, where a branch trail westerly is taken, which passes through the southerly portion of this township. From section 10 in this township, a new trail was cut northerly through the township, which is passable during the drier season of the year. The trail from Vegreville, northerly to Saddle lake is well used and in good condition throughout almost the entire year. From Saddle lake to Whitefish lake this trail is very bad during the wet season. The branch trail leading into this township is fairly good during the dry season. The surface soil of this township is from one to twelve inches in depth, part being of clay loam nature and part of a sandy loam nature. The subsoil is of a clay nature throughout almost the entire township, the exceptions being a few sandy ridges, where both the soil and subsoil is of a sandy, useless nature and also contains a number of muskegs throughout the township, where the soil is of a mossy mucky nature and of no value. The upland portion of this township is apparently fairly well suited to agricultural purposes for the most part rating as second class. This township is wooded throughout with timber, ranging in size from two to eighteen inches. A very large percentage of the timber is poplar and

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 14—Continued.*

balm of Gilead, from three to fourteen inches in diameter. Scattered birch is found from two to ten inches in diameter, while scattered spruce is found throughout the entire township, ranging in size from three to fifteen inches in diameter. Ridges of jackpine from six to twelve inches in diameter are found more particularly through the northwesterly quarter of the township. The muskegs and swampy inner lands of the township are timbered with a scrubby growth of spruce and tamarack from two to eight inches in diameter. A considerable area of this latter growth is found in a large muskeg running easterly through sections 20, 21, 22 and 23. Quite a large quantity of good hay has been cut for a number of years from the low flats to the easterly end of Lonepine lake, and also around the shore of a smaller lake in sections 3 and 4. There is also a large quantity of hay of good quality on the low flats to the east of the lake, located in sections 7 and 18. Considerable hay is to be found in flats along Beaver river but not to such an extent as that around the three lakes. A number of small hay sloughs are scattered throughout the township, but none of large size. All the water in this township appears to be fresh and the supply is sufficient and permanent. The hay flats of the township, are all flooded during the early part of the year, but apart from this the land in this township is not liable to be flooded to any extent, owing to the rolling nature of the country. Two streams of considerable size occurred in this township, Whitefish creek, flowing westerly through the southerly portion of the township, and Beaver river, flowing easterly through the northerly portion. Whitefish creek is a stream varying in width from forty to two hundred feet. It enters the township in section 12, flows through sections 12, 11, 10 and part of 9 into Lonepine lake leaving it in section 8, through this section and sections 7 and 18, into another small lake. This stream varies in depth from one to six feet, the greater part being of a very stagnant nature, with a barely perceptible current. Beaver river enters this township at the northwest corner of section 19 and flows easterly through sections 19, 20, 21, 22, 27, 26 and 25. The valley of this river is from seventy-five to one hundred and fifty feet deep, and averages about half a mile in width, the river itself being from seventy-five to one hundred and twenty-five feet wide and averaging from two and one-half to eight feet deep. The current is small, averaging probably not more than one mile per hour. A number of smaller streams, of little or no importance are met with in other parts of the township, the largest of these being a stream flowing out of a small lake in sections 32 and 33 in an easterly direction through sections 34, 35, 26 and 25 and flowing into Beaver river, near the easterly boundary of this township. No water-power is available in this township. The climate is apparently suitable for agricultural purposes. No summer frosts of any consequence are known to have occurred during the past season. Wood is the fuel most readily obtained in this township, and is available in abundance in every section. No coal or lignite veins, and no stone quarries nor minerals of economic value are known to occur in this township. Black bear, moose and caribou are plentiful in this township. Partridge are plentiful but prairie-chicken are not found here at all.—*W. H. Waddell, D.L.S., 1908.*

64. This township is reached by way of the main wagon trail from the town of Vegreville, on the Canadian Northern railway to lac la Biche and a branch trail leading from the former trail about four miles northerly from the settlement at Whitefish lake. This latter trail, taking a westerly course, runs to Lonepine lake in township 63, thence into a new trail northerly, through the centre of township 63, and this township. The main trail from Vegreville to lac la Biche is in splendid condition most of the year as far north as Saddle lake. From Saddle lake to Whitefish lake, it is in very bad shape during the wet season of the year. The branch trail to Lonepine lake and thence northerly, is fairly good during the dry season of the year. The crossing



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 14—Continued.*

of Beaver river in township 63, is very bad. The surface soil of this township is a loam of from two to eight inches in depth, which for the most part is classed as being of a sandy nature. The subsoil is of a sandy, clay nature throughout almost the entire township. A number of small muskegs occur throughout the township in which the soil is of a mossy, mucky nature and is comparatively useless in its present state. While this township cleared, might be rather hard to work owing to the shallow nature of the surface soil, I think it would be fairly well suited to agricultural purposes. This township is of a rolling nature and is heavily timbered throughout. With the exception of a heavy belt of spruce, a great percentage of the timber is composed of poplar and balm of Gilead from three to fourteen inches in diameter. There is a scattering of birch from two to six inches in diameter and also scattered spruce throughout almost the whole township, this latter being from four to fourteen inches in diameter. The muskegs and swampy land are timbered with scrub, spruce and tamarack from four to eight inches in diameter. The heavy spruce belt referred to above is composed of parts of sections 23, 26, 27, 28, 29, 32, 33, 34 and 35. About ninety per cent of the timber in this belt is very heavy spruce of first quality, ranging in diameter from fourteen to forty inches. There is also a scattering of balsam and balm of Gilead of about the same size. Very little hay was found in this township, there being only a small number of sloughs from which hay might be cut. Some might be cut from along the shore of Sherring lake, but this is doubtful, except in very dry seasons. All the water in this township is fresh, and the supply is sufficient and permanent. Little Beaver river enters this township in section 35 and flows in an easterly direction through sections 35 and 36. This river is from fifty to one hundred feet wide in this township and is from two to six feet deep, the current being barely perceptible. No other streams of importance flow through this township. There are four lakes of considerable size, in the southeasterly portion of the township, these being Desmaw, Olympic, Sherring and Kerr lakes. Owing to the rolling nature of the township, I do not think there is much danger from spring floods. No water-powers are to be found in this township. General indications point to a climate suitable to agricultural purposes. No summer frosts are known to have occurred during the past season. Wood is the fuel most readily available in this township, and can be found in abundance on every section. No coal or lignite veins are known to occur in the township. No stone quarries nor minerals of economic value have been found in this township. Moose and bear are plentiful, while caribou, I believe, are also found here. Partridge are plentiful, but prairie-chicken are unknown.—*W. H. Waddell, D.L.S., 1908.*

65. The best route for reaching this township is by way of the main trail from the town of Vegreville, via the Canadian Northern railway to lac la Biche, as far as a point about eight miles south of lac la Biche, in township 65, range 13, where a branch trail turns westerly and crosses through this township in an easterly and westerly direction near the centre of the township. It may also be reached by way of another trail, leaving the main trail four miles north of Whitefish Lake postoffice, thence in a westerly direction to Lonepine lake, thence northerly up the centre of range 15. Both these branch trails are in fair condition during the dry season of the year, but I judge would be impassable from the time of the spring break-up until August. The main trail from Vegreville is in splendid condition throughout almost the entire year. From Saddle lake to Whitefish lake, it is bad during the wet season. From Whitefish lake northerly it is bad at any season of the year. The surface soil in this township is a loam from two to twelve inches in depth, with a sandy clay subsoil with the exception, however, of the muskegs where the soil is of a mossy nature. The greater part of the soil is classed as second class. Some of the best, however, I have rated as first class. I think the greater part is specially adapted to agricultural pur-



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 14—Continued.*

poses. The most of this township is timbered. In the easterly part, however, the timber is much thinner and of a more scrubby nature than in the westerly portions. Small patches of open country occur throughout the easterly half, but these are of little consequence. A very large percentage of the timber of this township is poplar and balm of Gilead from two to twelve inches in diameter. A large portion of the north and westerly part of the township has been burnt over a number of times. Part of this brûlé timber has been blown down, but most of it is standing, though dead. In sections 3, 4, 5, 9, 10 and 14 there is a considerable amount of jackpine from four to twelve inches in diameter. The muskegs and swampy parts of the township are timbered with a scrub growth of spruce and tamarack from two to six inches in diameter. A number of these muskegs have been burnt over during recent years in the southerly portion of sections 4 and 5. There is a small area of very heavy spruce and balm of Gilead, the spruce composing fully ninety-five per cent of the timber, and is from twelve to forty inches in diameter. Large quantities of good hay have been cut along the flats of Little Beaver river through sections 26, 23, 22, 15 and 10. A number of smaller patches of good hay land occur throughout the township, but with the exception of Little Beaver flats no hay meadows of much consequence were located in this township. The water in this township is all fresh, and the supply sufficient and permanent. Little Beaver river enters this township in section 36, and flows in a southwesterly direction through this section and sections 25, 26, 23, 15 and 10, then turning in a southeasterly direction through sections 3 and 2. This drain is from fifty to seventy-five feet in width and from one to five feet in depth. The greater part of this river is of a stagnant nature, there being scarcely any flow whatever. There is a rapid, however, near the south side of section 10. A number of small streams flow into the Little Beaver in this township, one in section 10 from the west, two in section 23, one from the southeast and one from the northwest, being small but of a permanent nature, the flats along Beaver river varying in width from one or two hundred feet to half a mile and subject to early floods, as are a number of smaller low lying areas throughout the township, but I do not think that the land, which is suitable to agricultural purposes, is liable to be troubled with floods owing to the rolling nature of the country. No water-power is available in this township. General indications point to a climate suitable to agricultural purposes. No summer frosts are known to have occurred during the past season. Wood is the fuel most readily available here, and can be procured in abundance in any part of the township. No coal or lignite veins are known to occur. No stone quarries of any kind nor minerals of economic value are known to occur in the township. Moose are fairly plentiful, and I believe there are also a number of caribou to be found. Partridge are plentiful and there are also a few prairie-chickens.—W. H. Waddell, D.L.S., 1903.

*Range 15.*

27. This township can be reached by a good trail from Bassano, a station on the main line of the Canadian Pacific railway. The soil is chiefly clay, producing fairly good grass and mostly all suitable for general agricultural purposes. The surface is rolling prairie without any timber. There is not much hay land. There are no streams or springs, the only available water being a few small sloughs. Climatic conditions are favourable, and there is no special danger of summer frosts as far as could be noticed. Coal is obtainable at several points within fifteen miles. There are no stone quarries or minerals of economic value. A few ducks were seen, but no other game.—Geo. Edwards, D.L.S., 1907.

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 15—Continued.*

28. The most convenient route to this township is by trail from Gleichen or Bassano, stations on the main line of the Canadian Pacific railway. Both trails are in fairly good condition; that from Bassano is less hilly than the other. The soil is about one-half gumbo and the balance heavy clay, not very desirable for agricultural purposes, but fairly good ranch land. The surface is rolling prairie with no timber. There are no streams. The only water is in a few small lakes and sloughs most of which is alkaline. There are no hay lands of any considerable extent. Climatic conditions are very good, with no special danger from summer frosts. Indications of coal were noticed but none has been mined nearer than township 29, range 14. No stone quarries or minerals of value were seen. A few ducks and prairie-chickens were the only game noticed.—*Geo. Edwards, D.L.S., 1907.*

31. This township can be reached by wagon from the town of Stettler on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail which is a fairly good road during the summer months, except in a wet season. There are a few creeks and sloughs not as yet bridged which are difficult to cross. The soil is sandy loam and clay loam, very good for agricultural purposes. The surface is prairie with no timber or brush. Large quantities of hay can be cut on the meadows throughout the township. The water in this township is fairly good. Bullpound creek flows from what is known as the 'golden' hay meadow, at the southwest corner of the township easterly across the township, and contains water fit for domestic use, while along its banks are found springs of good water. Good water can also be obtained by digging. There are no water-powers. The climate is inclined to be dry but subject to extremes of drought and moisture. It was very wet this season, raining nearly every day during the month of June. There were no summer frosts up to September 1. There is no wood, but lignite coal has been found in the adjoining townships and no doubt will be found in this township in sufficient quantity for the use of the settlers. No stone quarries, minerals or mineral bearing rocks are found in the township, but plenty of field stone exist. Wild geese and ducks are very plentiful in this township; a few prairie-chickens and a few small animals were seen. This township is well adapted for ranching as there is good pasture, good water and lots of hay in the meadows scattered through the township.—*Lewis Bolton, D.L.S., 1908.*

32. This township can be reached by wagon from the town of Stettler, on the Lacombe branch of the Canadian Pacific railway by way of Handhills trail, which is a fairly good road during the summer months, except in a wet season. There are a few creeks and sloughs not bridged as yet that are difficult to cross. The soil is partly clay loam and partly sandy loam, very good for agricultural purposes. The surface is prairie with no timber or scrub. Considerable hay can be cut in the meadows throughout the township and around the lakes. The water is generally alkaline, a few springs are found in the ravines and around the shores of the lakes, of fairly good water. Wolf creek, a small stream flowing into Dowling lake, contains water that can be used for domestic purposes, but dries up early in the season. The water in Dowling lake, in fact in all the lakes, is alkaline. Good water can be obtained by digging. There are no water-powers. The climate is inclined to be dry, but subject to drought or excessive rains in some seasons; this season the month of June was very wet, raining more or less every day. There were no summer frosts up to September 1. There is no wood. Lignite coal is found in the adjoining townships and no doubt will be found here in sufficient quantity for fuel for the use of settlers. No stone quarries or minerals were found, but there is plenty of field stone. Great numbers of wild geese and duck are found on the lakes in this township, especially on Dowling

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 15—Continued.*

lake. Some prairie-chickens, a few antelope and coyotes but very few wild small animals were seen.—*Lewis Bolton, D.L.S., 1908.*

63. This township is reached by way of the main trail from Vegreville on the Canadian Northern railway to lac la Biche, and a branch trail from this leaving the main trail about four miles north from Whitefish Lake postoffice, the main trail from Vegreville to Saddle lake is in splendid condition throughout almost the entire year, while from Saddle lake to Whitefish lake it is good during the dry season, but very bad in the spring. From Whitefish lake to a lake in sections 7 and 18 in township 63, range 14, the trail is in fair condition during a dry season of the year. From this lake, however, it would take a considerable amount of work to open up the present trail through this township for summer use, as advantage was taken of all lakes and streams in making my trail through it. The surface soil is very shallow in most cases, being from one to six inches in depth, and of a sandy nature. The subsoil is of a sandy clay nature throughout in some cases merging into the surface soil, so that it is hard to distinguish between surface soil and subsoil. The muskegs of the township are of a mossy nature or ranked as fourth class, the upland soil being classed as second and third, with a greater part of the upland portions suitable for agricultural purposes. The township is of a rolling nature, and is heavily timbered throughout. The greater portion of the timber is made up of poplar and balm of Gilead, from three to fourteen inches in diameter, there being also a scattering of birch from three to ten inches, while scattered spruce is found throughout the entire township from six to eighteen inches. Some jackpine ridges occur scattered throughout the township the timber being from six to fourteen inches in diameter. The muskegs are timbered with scrub spruce and tamarack from two to six inches in diameter. A large swamp with dense willow is found in the northerly and westerly parts of section 20. Very little hay is to be found in this township, there being only a very small number of small meadows from which good hay might be cut. A little might also be cut in patches along the creeks, through the southerly portion of this township. The water of the township is all fresh and the supply is sufficient and permanent. A number of creeks from eight to fifteen feet in width occur in the southerly portion of the township. One of these flows through sections 6, 7, 8, 9 and 10, in an easterly direction converging therefrom, and to a southerly direction, flowing through sections 2, 3, 10, 11, 14; here it converges with one from the west flowing through sections 20, 17, 16, 15, 14 and 13, eventually emptying into Whitefish creek. The volume of water through these streams is very small during the dry season of the year, there being from six inches to two feet of water in the main stream, the current not being at all strong. Beaver river enters this township in section 36 and flows southerly through sections 36 and 25, leaving the township in the southeast corner of section 25. This stream is about sixty feet in width, and from two to four feet deep through this township, the current being rather sluggish. The river here flows through a valley from one-quarter to one-half mile in width and about one hundred feet in depth. The township is in little or no danger from floods owing to the rolling nature of the country. No water-power is available in this township. The climate appears to be suitable for agricultural purposes. Wood is the fuel most readily obtainable here and may be procured in abundance in any part of the township. No coal or lignite veins are known to occur in the township. No minerals of economic value were noticed. Black bear and moose appear to be very plentiful in this township, and I believe caribou are also found here. Partridge are plentiful but prairie-chickens are unknown.—*W. H. Waddell, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 16.*

27. This township is accessible by a good trail from Gleichen, which is distant about sixty miles. The soil is chiefly clay, one-third of the area being suitable for agricultural purposes, and the remainder good ranching land. The surface is open prairie with no timber, over half of it being hilly. There are no streams, the only available water being in a few sloughs. The only place where good water was found was in a slough on the east boundary of section 23. Good hay land is found in sections 5 and 6. There is no fuel supply in the township, but coal of fair quality can be had within 15 miles. There are no stone quarries or minerals of economic value. Game is not plentiful, only a few ducks being seen.—*Geo. Edwards, D.L.S., 1907.*

28. The route to this township is by a good trail from Gleichen. The soil is chiefly clay suitable for ranching purposes, but the surface is too rough for agricultural purposes except in the northern part of the township, where there are several sections of good farm land. The surface is open prairie without any timber. There is good upland hay on several sections in the west half of the township. Little Fish lake covers a large part of sections 5, 6, 7 and 8. It contains good water, and in some places has a depth of twenty feet. There are also some small streams of good water. The climate is good, and there is no special danger from summer frosts. The nearest available fuel is twelve miles distant. There are no stone quarries or minerals of economic value. A few ducks, geese and prairie-chickens were seen.—*Geo. Edwards, D.L.S., 1907.*

31. This township can be reached by wagon from the town of Stettler, on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail, which is a reasonably good road during the summer months except in wet seasons. There are a few creeks and sloughs not bridged as yet that are difficult to cross. The soil is chiefly sandy loam, good for agricultural purposes. The surface is prairie with no timber or scrub. Small hay meadows are scattered throughout the township and at the southeast corner. What is known as the Golden hay meadow is situated where large quantities of hay are cut every year by the ranchers. The water in this township is not very good, being slightly alkaline. That in the small lakes is not fit for domestic use. There are a few springs throughout the township, but the water is more or less alkaline. One branch of Wolf creek crosses the northwest corner of the township. The water in it is fairly good, but the supply is small. Good water can be obtained by digging a reasonable depth. There are no water-powers. The climate is inclined to be dry, but is subject to extremes of drought and moisture. There were no summer frosts this season. There is no wood, but lignite coal has been found within the township, and when properly opened up settlers will be able to obtain a supply for their use. No stone quarries, minerals or mineral bearing rocks were seen in the township, but plenty of field stone exist. There is very little game in the township. A few wild ducks around the small lakes and ponds and a few prairie-chickens were all that were met with.—*Lewis Bolton, D.L.S., 1908.*

32. The Handhills trail from Stettler leads close to the westerly boundary of this township. This trail is a fairly good road for wagons during the summer months, except in a very wet season. There are several creeks and sloughs not yet bridged that are difficult to cross. The soil is chiefly sandy loam and clay loam suitable for agricultural purposes. The surface is prairie, generally rolling, with no timber or scrub; some small meadows are scattered through the township. The supply of hay is very limited, there being only a few small meadows in the township, none of any considerable area. The water is not good, being slightly alkaline. Some small lakes contain water not fit for domestic use. One branch of Wolf creek containing a small amount of fairly good water crosses the southwest corner of the township. Good

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 16—Continued.*

water can be obtained by sinking wells. There are no water-powers. The climate is inclined to be dry, but subject to extremes of drought and moisture. No summer frosts occurred this season. There is no wood, but lignite coal has been found along the banks of Wolf creek; no doubt a sufficient supply can be obtained for the use of settlers. No stone quarries, minerals or mineral bearing rock were found in the township, but plenty of field stone occur. Game is not plentiful. Wild geese and duck are found around the lakes and sloughs. A few coyotes and antelope were seen. Smaller animals were very scarce.—*Lewis Bolton, D.L.S., 1908.*

41. This township is for the most part a rolling country with scattered clumps of poplar and willow bush. The southwest corner is broken by the valley of Battle river which flows southeasterly through sections 18, 7, 8, 5, 4 and 3; and Bigknife creek which flows easterly through sections 6, 5, 4 and 3 where it empties into Battle river. The soil is rich sandy loam with clay subsoil. That part of the township southwest of Battle river is broken and rough with large clumps of willow bush, poplar, balm of Gilead and spruce. The township is well settled. Good crops of grain, principally wheat and oats are grown and vegetables such as potatoes, cabbage, beets, carrots and cauliflower. Trails through the township are well travelled, but there has been only a small amount of work done on the road allowances. Wood as fuel is plentiful. There were no indications of mineral seen. Game consists chiefly of duck, but there are a few prairie-chicken, coyotes and lynx. Hastings coulee post-office and general store are situated in the northwest quarter of section 23.—*T. A. Davies, D.L.S., 1907.*

*Range 17.*

27. The route to this township is by a good trail, rather hilly from Gleichen. The soil is chiefly clay producing good grass and well adapted for ranching. The surface is open prairie and mostly very hilly. There is no timber except along Red Deer river where there is considerable small timber consisting of willow, birch and cottonwood. There is considerable good upland hay in the centre and northern portions of the township. Red Deer river traverses the township from section 18 to section 2. The valley of the river is about one mile wide, with banks four hundred feet high. The current of the river is swift, its width varies from five to fifteen chains and its depth at low water is two to ten feet. The water is good. There are no rapids or falls that could be utilized for power. There are a few springs and small streams of good water. The climate is good, and only the average danger of summer frosts. The only fuel obtainable is wood along the river, but the large timber has mostly all been cut away. Indications of coal are seen in some of the coulees along the river. Coal is obtainable fifteen miles west. Stone can be had all along the river but no quarries have been opened up or worked. No minerals were noticed. A government ferry is located on section 4. There are also fords at two or three places where the river can be crossed in low water. Geese, ducks and prairie-chickens are plentiful. A few deer are seen occasionally along the river.—*Geo. Edwards, D.L.S., 1907.*

28. This township can be reached with wagons by way of the Handhills trail, which is a fairly good road during the summer months, except in a wet season. Some of the creeks and sloughs not yet bridged are difficult to cross. The soil is partly of chocolate clay and partly of sandy loam, but is more or less mixed with stone, making it difficult to cultivate although it is very productive. Very heavy crops of grass grow all through the township; this season hundreds of tons of excellent hay were cut on the uplands. The surface is prairie with no timber or scrub except a little in

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 17—Continued.*

the ravines. Part of the township is considerably cut up with deep ravines running towards Red Deer river, but in other parts of it is gently rolling. No hay meadows of any great extent occur in the township but hay can be cut on all the uplands; this year the crop was excellent. The supply of water is very limited, there being very few sloughs or creeks; that in Fish lake is not fit for domestic use. A few springs in the ravines contain very good water, and it can be obtained by digging. There are no water-powers in the township. The climate is inclined to be dry and subject to extremes of drought and moisture. This season was very wet during the month of June, while last season was very dry. No summer frosts occurred this summer until after September. There is no wood in the township. Seams of lignite coal were seen in some of the ravines in the southwesterly portion and no doubt plenty for the use of settlers can be obtained in the township. There are no stone quarries or minerals but there is plenty of field stone. Great numbers of water-fowl were seen around Little Fish lake. Prairie-chickens and small animals were not plentiful; a few antelopes were seen. The township is well adapted for ranching. The grazing is excellent, especially that part around Little Fish lake, where large quantities of hay were cut this season.—*Lewis Bolton, D.L.S., 1908.*

29. This township can be reached from the town of Stettler on the Lacombe branch of the Canadian Pacific railway by way of the Handhills trail, which is a good road during the summer months except in a wet season; there are a few creeks and sloughs not yet bridged which are difficult to cross with heavy loads. The soil is chiefly clay loam and sandy loam good for agricultural purposes. The surface is prairie except in the ravines and on some hillsides where there is poplar and willow. The township is considerably cut up with deep ravines, especially the southerly and westerly portions; the remainder is gently rolling prairie and good for agricultural purposes. There are a few balm of Gilead and poplar trees, in the ravines, large enough for building purposes but the timber in general is small but good for fuel. Considerable hay has been cut in the meadows and uplands throughout the township. There are quite a number of springs in the ravines containing very good water, these being the only supply in the township. Good water can be obtained by digging fifteen or twenty feet. There are no water-powers. The general indications suggest a dry climate but some seasons are extremely wet while others are extremely dry. This season was very wet during the month of June. No summer frosts occurred this season before September. Considerable wood can be obtained, in the ravines and on hillsides, for fuel. No doubt coal can be found in the ravines. We did not observe any in this township but did in the adjoining township. Plenty can be easily obtained for the use of settlers. There are no stone quarries or minerals but abundance of field stone can be had. Very little game is found in this township; there being no sloughs or lakes; there are no water-fowl. A few chickens and coyotes and an occasional antelope were all the game found in the township. Sections 1, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35 and 36 are fit for agricultural purposes, while the remainder is only fit for ranching, being very rough and hilly and cut up with deep ravines.—*Lewis Bolton, D.L.S., 1908.*

30. This township can be reached from the town of Stettler on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail, which is a very good road during the summer months except in a wet season; there are a few creeks and sloughs that are not as yet bridged which are difficult to cross. The soil is chiefly sandy loam very good for agricultural purposes. The surface is chiefly prairie; the northerly part of the Hand hills is in this township and the surface is considerably broken by ravines running down from the higher elevations to the foot



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 17—Continued.*

of the hills. In these ravines there is some poplar and willow; some of the poplar is large enough for building purposes, but the supply is small and the settlers in the township have cut a good portion of it for their use. There is also considerable large willow suitable for fence stakes and the settlers are availing themselves of it for fencing purposes. Considerable hay was cut on the uplands this season also in the meadows on the top of the Hand hills. There appeared to be a good crop of grass on the higher parts of the hills. There are quite a number of springs in the ravines in the Hand hills containing very good water, besides these there is very little water in the township. Good water can be obtained by digging fifteen or twenty feet. There are no water-powers. The climate is on the average not so dry as the adjoining low lying lands. Showers appear to fall among the hills and pass over the lower lands. The crop of grass was much heavier on the top of the Hand hills than on the low lands adjoining. There were no summer frosts this season before the end of August. There is considerable wood in the ravines and on the hillsides for fuel. Lignite coal has been found in considerable quantities in the northerly part of the township in sections 21 and 22. Considerable has been taken out of section 21, but the seam at present is on fire and should be extinguished or a great quantity of coal will be destroyed. There are no minerals or mineral bearing rocks. Very few water-fowl are found in this township. There are a good many prairie-chickens, a few deer but not many small animals. This township is well adapted for ranching, there being good pasture, plenty of hay and good shelter for cattle in the ravines in winter time, and good water. There are at present a good many settlers in the township, mostly ranchers.—*Lewis Bolton, D.L.S., 1908.*

31. This township can be reached by wagon from the town of Stettler, on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail which passes through this township. This trail is a very good road during the summer months except during a wet season, as there are a few creeks and sloughs not yet bridged that are difficult to cross with heavy loads. The soil is clay, clay loam and sandy loam; in some of the flats there is gumbo. The loamy soils are good for agricultural purposes. The surface is prairie with no timber or brush and gently rolling. There is not a great quantity of hay in the township. The sloughs and low meadows are about the only places that hay can be cut, and they are few and small. The water is more or less alkaline. That in the sloughs is the best, but they dry up early in the season. There are a few springs in the ravines forming the head of Wolf creek, but they are more or less alkaline. The supply is very limited in the township; good water can be obtained by digging. There are no water-powers in the township. The climate is inclined to be dry and subject to extreme drought and extreme moisture. This season was very wet during the month of June, while last season was the reverse. There is no wood in the township. Lignite coal is found in the adjoining townships, and no doubt a sufficient supply can be obtained for settlers in this township. No stone quarries were seen in the township, but there is an ample supply of field stone for all purposes. There is very little game of any kind in this township, there being very few sloughs or ponds for water-fowl and no bush or scrub for the shelter of wild animals.—*Lewis Bolton, D.L.S., 1908.*

32. This township can be reached from Stettler, a town on the Lacombe branch of the Canadian Pacific railway, by way of the Handhills trail that passes through this township. This trail is a fairly good road during the summer months except in a wet season. There are a few creeks and sloughs not yet bridged which are difficult to cross with heavy loads. The soil is clay, clay loam and sandy loam, and in the flats of Wolf creek and in many other low places, gumbo. The loamy soils are good for



## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 17—Continued.*

agricultural purposes. The surface is prairie with no timber or brush, except a few bunches of willow along the banks of Wolf creek. Considerable hay can be cut in the meadows throughout the township; they are mostly small and scattered through the township. The water is more or less alkaline, a few springs in the ravines have fairly good water. That in Wolf creek can be used for domestic purposes, but it is not very good. The supply in the township is very limited, but good water can be obtained by digging. There are no water-powers. The climate is inclined to be dry and subject to extremes of drought and moisture. This season was very wet through the month of June, while last year was the reverse. There were no summer frosts up to September 1. There is no wood, but lignite coal has been found in the adjoining townships, and no doubt a supply for fuel for settlers will easily be obtained. No stone quarries were found, but there is plenty of field stone for all purposes. No minerals or mineral bearing rocks were seen in the township. Very little game was seen; there are a few ducks and geese in the small lakes and ponds and a few prairie-chickens, also a few coyotes and badgers, but very few small animals.—*Lewis Bolton, D.L.S., 1908.*

41. This township is broken up into five parts by Battle river, which enters on the north boundary of section 35, flows southerly and leaves the township on the east boundary of section 13. Meeting creek which enters near the northwest corner of section 19, flows in an easterly direction into Battle river close to the quarter section corner on the east boundary of section 26; Willow creek, entering on the south boundary of section 4, which flows northerly through sections 4 and 9, turns to the northwest and leaves the township on the west boundary of section 19, and Bigknife creek, which enters on the south boundary of section 3, flows northerly through sections 3 and 10, turns to the east and south and leaves the township on the east boundary of section 1. The surface between these valleys is rolling, with scattered clumps of poplar and willow bush. The soil is generally a sandy loam with clay subsoil, and in some few parts a sand subsoil. Most of the settlers have made extensive improvements, harvesting large crops of wheat, oats and flax. The quarter sections were almost all fenced, large barns and houses being built. Meeting creek, a stream of muddy water and slightly alkaline, is generally twenty-five feet in width, three feet deep, and flows at an approximate rate of two miles per hour. Grain can be raised in the valley, which is fifty chains wide, as was shown by a very fine crop of oats in the eastern part of section 30. Farther east in the valley good wild hay grew luxuriantly. There are clumps of spruce and poplar from two to ten inches. Willow creek, with a general width of twenty feet, two feet deep and flowing at approximately one mile per hour, contains good drinking water. Grain was being grown in this valley also. Good wild hay is plentiful, as is also spruce, poplar and tamarack. Bigknife creek, ten feet across, average depth one foot and with a current of one mile per hour, flows through a rough and broken coulée varying from ten to twenty chains in width. Spruce and poplar two to eight inches in diameter grow scattered and in clumps. The water in the creek is pure. A few small lakes and sloughs, which are free from alkali, are scattered throughout the township. Large numbers of duck were seen. There were a few coyotes and lynx.—*T. A. Davies, D.L.S., 1907.*

42. Battle river flows through the centre of this township in a southerly direction. Sections 25 to 36 are rolling prairies with a few scattered clumps of poplar and willow brush. The soil is a light sandy loam with a clay subsoil. Wild hay does not grow so well as in other parts of the township. Almost all of the settlers are in the southern two-thirds of the township. This is a rolling country with large clumps of poplar and willow bush. Some groves of spruce and birch from two to ten inches in diameter are in the river valley and the many adjoining coulées. The soil is a sandy

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 17—Continued.*

loam with a clay subsoil. Wheat and oats are the principal products; a few of the settlers grow potatoes, cabbage, carrots, beets and other vegetables of good quality. Coal has been located in small quantities in several places along the valley slopes and is used as fuel. Wood, however, is the chief fuel supply. There is one small rapid on Battle river near the north central part of section 16. The river can be forded here. Ducks are numerous and a few coyotes are found. There is one school situated in the southwest quarter of section 4.—*T. A. Davies, D.L.S., 1907.*

43. About one-third of this township is considerably broken by the valley of Battle river and the many coulees which extend into it on both sides of the valley. The remaining two-thirds is rolling, with scattered clumps of poplar and willow bush. The soil is a sandy loam with clay subsoil. There are a few small sloughs of fresh water and one creek of alkaline water, which crosses the north boundary of section 10, the east boundary of section 9 and thence flows into Battle river. Coal was seen in several places along the river valley. The most of the settlement is in the northern half of the township, where some large fields of wheat and oats were growing. Summer frosts did not occur.—*T. A. Davies, D.L.S., 1907.*

*Range 18.*

27. The route to this township is by trail from Gleichen. The soil is chiefly clay, suitable for ranching; and the surface is open prairie, mostly very hilly. There is no timber except along the banks of Red Deer river, where there are clumps of small willow, birch and poplar. Red Deer river traverses the township from section 31 to section 13. It has a rapid current and the water is good. Its valley is about one mile wide, with hills four hundred feet high. There are no rapids or falls suitable for water-power. There is good upland hay in the north part of the township. The climate is good, and summer frosts not unusually prevalent. There is no fuel supply here, but coal is obtainable in the next township west. There are no minerals, but there is some sandstone in the hills along the river that could doubtless be utilized for building purposes, though none of it has been worked. Geese, ducks and prairie-chickens are plentiful.—*Geo. Edwards, D.L.S., 1907.*

43. Battle river enters this township on the north boundary of section 32, flows southeasterly and leaves the township close to the northeast corner of section 12. The surface generally is rolling, with many large clumps of poplar and willow brush and a few scattered birch. The soil is a rich sandy loam with clay subsoil. No indications of coal or other minerals were seen. The sloughs are free from alkali, and the water is good for drinking purposes. The settlers have not made as many improvements as those in the township to the north in regard to grain growing. Large quantities of good wild hay grow in most of the sections. Close to the quarter section corner, on the east boundary of section 32, is the Ferry Point general store and postoffice. There is a school situated on section 4, and a church on section 30.—*T. A. Davies, D.L.S., 1907.*

44. With the exception of sections 5 and 6, where Battle river flows, this township has an undulating surface, with scattered clumps of poplar and willow brush. There are a few small clumps of poplar from two to six inches in diameter. The soil is a black and sandy loam with clay subsoil. There are few small sloughs, which are free from alkali. The water used is mostly taken from wells. The settlers are well advanced with their farms, growing large crops of wheat and oats. Plenty of good wild hay grows on the uncultivated land.—*T. A. Davies, D.L.S., 1907.*

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 18—Continued.*

60. This township is reached by a trail along the east side of Smoky lake from Pakan. The soil is from four to eight inches of leaf mold over clay, and is suitable for mixed farming. The surface is gently rolling and covered with timber consisting of poplar, spruce and tamarack, also some small white birch. Spruce from ten to fourteen inches in diameter occurs in clumps along the edges of swamps and lakes. The poplar is generally small, being from four to eight inches in diameter, while the undergrowth is willow, hazel, cranberry and saskatoon bush. Small fruits such as raspberries, gooseberries, cranberries and red and black currants are plentiful. Hay in this township is very scarce. There are some small patches of grass on the west side of sections 30 and 31, and on the west side of section 21 along the lake shore. The water is strongly alkaline, except the lake on the west of sections 30 and 31, which is fresh. There are no water-powers. The climate was wet and cold this season. A frost on the morning of July 13 formed a thin coating of ice over our water bucket. There was also a frost on August 21, which froze the crops in township 59, range 19. There is plenty of wood for fuel on every section. There were no stone quarries or minerals seen. Game consists of moose, bear, partridge and duck in season.—*Hugh McGrandle, D.L.S., 1908.*

*Range 19.*

32. A good trail from Stettler runs into the township at McKee lake. The soil is generally a heavy clay loam suitable for mixed farming. The surface is generally hilly, except on the east side, with small patches of poplar and willow scrub in the hollows. There is no timber of any value and no hay in the township. The water is generally fresh, and a sufficient quantity is found in the sloughs and McKee lake. There is no danger of flooding and no water-power. The climate is dry and subject to summer frost. Wood may be procured in the township to the north, and coal along Red Deer river to the west. There was no coal found in the township, neither stone quarries nor economic minerals. Ducks and geese were seen on the lake and sloughs.—*C. C. Fairchild, D. L.S., 1907.*

44. The surface of this township is generally rolling, but broken by the valley of Battle river, which flows from the northwest to the southeast corner. On that part of the township to the northeast of the valley there are scattered clumps of second-growth poplar and willow brush, and on the part to the southwest clumps of this brush are more numerous and dense. In the north halves of sections 32 and 31 there are a few groves of poplar and birch from two to six inches in diameter. The soil is a rich black and sandy loam with clay subsoil. The main products are wheat and oats of first class quality. Good wild hay grows abundantly. The only body of water, besides a few small sloughs, is Battle river, which enters this township about the centre of the north boundary of section 31, and is here approximately twenty-nine chains in width. It flows in a southerly direction as far as the northeast corner of section 18, where it bends toward the east, gradually becoming narrower through sections 17, 16, 15, 10, 11 and 1, and leaves the township near the centre of the east boundary of section 1, where it is approximately two chains across, its general width. The river has a uniform rate of approximately two miles per hour, and is without falls or rapids. In this township the river bed is soft and impossible to ford. At the time of survey (May) the water was low, and varied from two to ten feet in depth. There was a large number of cattle feeding along the river flat. The only mineral in this township is coal, which lies in pockets along the slopes of the valley. The water of the river and sloughs is free from alkali and good to drink. There were no fish in the river, and duck was the only game seen.—*T. A. Davies, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 19—Continued.*

60. This township is reached by a good wagon trail which follows the east side of Waskatenau creek from Pine Creek postoffice to the southwest quarter of section 5, where it ends. The soil is a sandy loam over clay suitable for mixed farming and grazing. The surface is covered with thick poplar and willow scrub, with clumps or patches of poplar and spruce from six to fourteen inches in diameter. The south third of the township is slightly rolling, with numerous small sloughs. The centre third is mostly all swamp and muskeg, with small spruce and willow, and islands or ridges of small poplar. The north third is slightly rolling, with more green timber, especially in the northwest corner. There are clumps of spruce from eight to fourteen inches in diameter along or near the edge of swamps. There is considerable hay in the township, especially along Waskatenau creek in sections 6 and 7. There are also numerous grass sloughs scattered all over the township, but the slough grass is of a coarse variety. There is a good supply of fresh water apparently permanent, except in very dry seasons. Waskatenau creek, a stream from thirty-five to forty links wide, with banks from four to six feet high, enters the township from the west at the southeast quarter of section 18 and flows southeasterly through sections 6 and 7, leaving the township near the southeast corner of section 6. At present the creek contains but very little running water. Along the course of this stream are large hay sloughs, which would be flooded at every high water. A small stream flows south from the southeast quarter of section 36 through sections 25 and 24, and another through sections 35, 26 and 24 into Smoky lake, but these small streams are not permanent in dry seasons. There are no water-powers. The climate this season was wet and cold, with frosts on July 13 and August 21. There is plenty of wood for fuel in every section. There was no coal or lignite seen, neither stone quarries nor minerals of any kind. Game consists of moose, bear, partridge and ducks in season. Small fruits such as gooseberries, raspberries, cranberries and red and black currants are plentiful in the northeastern portion of the township.—*Hugh McGrandle, D.L.S., 1908.*

63. (North and east outlines.) This township is reached with pack horses, and there is no trail for wagons. Along the east boundary there are a few inches of black loam with sandy clay subsoil. The surface is rolling and suitable for grazing purposes. Some spruce is found in section 25 from twenty to thirty inches in diameter along a large lake extending from the northeast corner across the south boundary. There is no hay in the township except a small quantity along the lake. Fresh water is supplied by this lake, but there is no water-power. The climate is good, with no indications of summer frost. Wood for fuel can be obtained in every section, but no lignite veins, stone quarries, nor minerals of economic value were found. Moose and bear were the only game seen.—*J. L. Coté, D.L.S., 1908.*

64. There is no trail to this township. The soil is very light and stony, and would be more suitable for grazing than farming. The surface is generally rolling. The northwest half, as a rule, is brûlé, while the southeast half is covered with various kinds of green wood. There is no timber of any value, nor was any hay noticed. Fresh water was found in numbers of muskegs throughout the township, but the creeks were small and dry in August. No waterfalls were seen, and no water-power can be developed. There is no summer frost, and the climate is good. There are quantities of fuel on every section, but no lignite veins were noticed. There are no stone quarries nor minerals of economic value. Moose and bear are plentiful.—*J. L. Coté, D.L.S., 1908.*

65. A wagon trail from Achabaska Landing to Skeleton lake has been opened this summer and passes through the south tier of sections of this township. It is in fair condition. The soil is generally light, but about one-third of this township may be classified as second-class soil, being black loam with clay subsoil. The surface is

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 19—Continued.*

generally wooded, though most of it is dry on account of the fires which occurred a couple of years ago. There is no timber nor hay. Flat lake covers parts of sections 19, 30 and 31, while Skeleton lake covers parts of sections 12, 13 and 14. Both lakes contain fresh water. There is also a couple of small creeks giving an ample supply of fresh water. There are no water-powers. The climate is good, and there is no indication of summer frost. Wood as fuel can be obtained in every section, but no lignite veins were observed in the township. There are no stone quarries nor minerals of economic value. Game is rather scarce, but whitefish is plentiful in Skeleton lake.—*J. L. Coté, D.L.S., 1907.*

67. The government wagon road from Athabaska Landing to lac la Biche passes close to the south boundary of this township. The soil, as a rule, is composed of two or three inches of black loam, with a brown loam or clay subsoil. It is suitable for mixed farming. The surface is covered in places with poplar and birch bush chiefly, with open brûlé. Pine creek flows through the southeast part. There is some good spruce timber in the west half of section 35 and the east half of section 34, varying from twelve to thirty-six inches in diameter. Upland hay might be cut along Pine creek valley, with a little clearing, for feeding purposes, but there is no open hay land. Fresh water is always obtainable from Pine creek, as well as from small muskegs throughout the township. No land is liable to be flooded. The only available water-power is on Pine creek, a stream from thirty to forty feet wide, with a current of two and one-half or three miles an hour; the valley is about one hundred feet deep. The climate is good. No indications of summer frosts were noticed. Wood as fuel is obtainable on every section, but no lignite veins were seen. There are no stone quarries nor minerals of economic value. Moose and bear were found.—*J. L. Coté, D.L.S., 1908.*

*Range 20.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Hand hills via Big Valley creek, and which passes through this township, entering it in section 32 and leaving it in section 4. The soil averages from three to six inches of black loam or sandy loam over a clay or sandy clay subsoil, and may be described as mostly third class and good ranching country, but in the extreme west of the township there is some fairly level land which would be suitable for mixed farming. The surface is mostly rolling or steeply rolling prairie with scattered clumps of gray willow and poplar brush. There is no timber of any description. Small hay meadows are scattered all through the township. Water is fairly plentiful, there being numerous fresh water ponds scattered all through the township and in sections 26 and 27 there is a lake called lake No. 1 which is ten or twelve feet deep and which is very milky in appearance, but is only very slightly alkaline. Also in sections 19, 30 and 31 there is a small fresh water creek, which has pools of water along its course. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities all through the township, there being scattered clumps of dry willow and poplar two to three inches in diameter. There are no coal or lignite veins, stone or minerals. There is no game.—*R. H. Cautley, D.L.S., 1907.*

60. This township is reached by a good wagon trail which follows the east side of Waskatenau creek from Pine Creek postoffice to the southwest quarter of section 5, township 60, range 19, thence by a rough trail along this creek to the southwest corner of section 18. It may also be reached by a wagon trail following along the east side of Sucker creek from the bridge on the Fort Saskatchewan trail to the northeast corner of section 35, township 59, range 20, but this trail would be almost impassable in wet sea-

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 20—Continued.*

sons as it follows a chain of grass sloughs which would be flooded. The soil of this township is a light loam over clay which is suitable for mixed farming and stock raising. The surface is level and swampy with numerous grass sloughs and is covered with timber consisting of poplar, cottonwood and spruce, from four to eight inches in diameter, with some small tamarack. There is some green spruce in sections 15 and 16, from ten to fourteen inches in diameter. The timber in the interior of the township is mostly firekilled. Hay is plentiful along Waskatenau creek and its branches and in numerous sloughs in the southern part of the township. The water except that in Waskatenau creek is alkaline and is obtained from swamps or sloughs. There is no flooded land except along this creek. There are no water-powers. The climate this season was wet and cold with summer frosts. There is plenty of wood for fuel in every section. There are no stone quarries or minerals found in the township. The only game seen was moose, bear and partridge.—*Hugh McGrandle, D.L.S., 1908.*

63. (North and east outlines.) This township is reached by means of pack horses as there is no trail for wagons. Along the east boundary the soil is poor, much of it being muskeg with ridges of sand, except in section 1 where it is a clay soil. The surface is level but unsuitable for farming on account of the muskegs. There is no timber of any value, nor is any hay found in the township. Plenty of fresh water can be obtained from the muskegs but there is no water-power. The climate is good with no indication of summer frost. Wood for fuel can be obtained in every section but no lignite veins, stone quarries nor minerals of economic value were found. Moose and bear were the only game seen.—*J. L. Coté, D.L.S., 1908.*

64. From Athabaska Landing there is good road to Pine Creek postoffice, and from there to this township there is a rough trail, part of which we repaired and produced into the township. The soil generally is light and suitable for mixed farming. Most of the country is burnt, except for some bluffs of green woods and the twelve southern sections, which have not been touched by fire. There is no timber of any value. Thirty or forty tons of hay could be cut along the small creeks. Two creeks cross the township from the south, flowing north towards Flat lake. They are about twenty links wide, and give an ample supply of fresh water. No land is liable to be flooded. There are no waterfalls, and no water-power could be developed. The climate is good, with no summer frosts. Wood as fuel is available on every section, but no lignite veins were noticed. There are no stone quarries nor minerals of economic value. Moose, bear and deer were seen.—*J. L. Coté, D.L.S., 1908.*

67. There is no trail to this township, except a sleigh trail from Athabaska Landing following the correction line on the south side of the township. The soil is poor and suitable only for grazing purposes. The southern part of this township is practically all muskeg, while the northern part contains several large lakes, with poplar ridges. There is no hay and no timber of any marketable value. Fresh water can always be obtained in abundance from the lakes and muskegs. No land is liable to be flooded. No water-power can be developed. Wood as fuel can be obtained on every section, but no lignite veins were noticed. There are no stone quarries nor minerals of economic value. Moose, caribou and bear were seen.—*J. L. Coté, D.L.S., 1908.*

*Range 21.*

59. This township is reached by a wagon trail on the east side of Sucker creek. It commences at the bridge over this creek on the trail to Fort Saskatchewan and enters the township at the southeast corner of section 25. It then follows a chain of



## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 21—Continued.*

wet sloughs, and would be impassable in wet weather. The soil is a black loam over clay, and is suitable for mixed farming. The surface is comparatively level or slightly undulating and covered with timber and willow scrub. The timber consists of poplar, cottonwood and spruce, from four to eight inches in diameter, and a few scattered spruce, from ten to fourteen inches in diameter, suitable only for settlers' use. Most of the timber is firekilled, especially that portion south of Sucker creek. The portion north of the creek is mostly swamps and sloughs, with islands and ridges of poplar. There is a large quantity of good hay along the creeks and sloughs in the south part of the township. The water is fresh and the supply sufficient and permanent from the numerous small ponds throughout the township. Sucker creek, a stream from fifteen to twenty-five links wide, flows in a southeasterly direction through sections 30, 29, 20, 16, 15, 22, 23 and 24. This creek flows through a hay slough with a slow current. The banks are clay and from three to four feet high. It freezes to the bottom in winter, and is dry in dry seasons. There is no water-power. The climate was cold and wet this summer, with occasional frosts. There is plenty of wood for fuel and building in almost every section. There are no stone quarries or minerals of economic value found in the township. Game consists of bear, moose and partridge.—*Hugh McGrandle, D.L.S., 1908.*

60. This township is reached by a wagon trail from the Fort Saskatchewan road along the east side of Sucker creek to section 2 and follows the creek to the north boundary of section 22. From section 14, township 59 the trail follows a chain of sloughs and can be travelled only in dry seasons. The soil is a rich black loam from three to eighteen inches deep over clay. It is suitable at present for small farming or stock raising only, as the township is very swampy with patches of dry land. The swamps are shallow and will no doubt dry up and make good meadow land when the timber is removed. The surface is very level and covered with timber with the exception of some open muskegs and grass sloughs consisting of poplar, spruce and some tamarack, from four to eight inches in diameter. There is also a few scattered spruce, from ten to twelve inches in diameter. There is a clump of spruce, from ten to fourteen inches on the north half of section 26 and the south half of section 35. There is a large quantity of hay in this township, especially on both sides of Sucker creek and on the numerous sloughs in every section. The grass in the west portion of the township is of a very poor quality being mostly coarse swamp grass. The water is alkaline in the numerous small ponds in the swamps and sloughs throughout the township. Sucker creek, a stream from twenty-five to thirty links wide and about two feet deep, flows in a southeasterly direction through sections 2, 11, 15, 14, 22, 27, 28, 32 and 33. It has a slow current, and flows through a grass slough from fifteen to thirty chains wide. The banks are from four to five feet high and if the creek should rise above them most of the swamps and sloughs in the township would be flooded. There is no water-power, stone quarries or minerals but there is plenty of wood for fuel on every section. The climate was wet and cold this summer with occasional frosts. Game seen consisted of moose, bear and partridge.—*Hugh McGrandle, D.L.S., 1908.*

64. This township is about five and a half miles east of the trail from Edmonton to Athabaska Landing; it is a good wagon road. There is an old winter trail from this into the southern sections, and a winter and hay trail runs from a more northerly part of it into the northerly centre of the township, otherwise there are no roads. The surface is rolling, undulating in the southern portion and rolling more heavily in the northern sections which are somewhat broken by the creek valleys, which, flowing northward, deepen in their courses and become more ravine-like. The largest of these called Pine creek intersects the township approximately about the middle. Its valley



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 21—Continued.*

is broad and somewhat shallow, with shallow swamps bordering the stream over the greater portion, but towards the north line the valley becomes more of a ravine and the swamps disappear. Most of the swamps appear to be shallow and easily drained and would probably make good land. They are, as a rule, timbered with spruce and tamarack and brush mostly of small size and usually under four inches in diameter. The remainder, and by far the greater portion, of the surface is rolling upland, the soil a stiff clay covered by a scanty deposit of black loam. The greater portions appear to have been destroyed by the fierce bush fires that destroyed the large timber which seems at one time to have covered the township, and of which some few groves and clumps still remain along the east boundary in windfall of the same nature. The growth over the greater portion is small poplar and willow brush, the latter running from a few feet to twelve feet high. The timber is useful only for fuel and local purposes, the few clumps of large spruce and poplar covering but small area. The clay soil supports a good growth of grass, but only small hay meadows are to be seen along the line of the creeks in old beaver dams, and bordering shallow mud-bottomed lakes of which there are about ten in the township. Though no doubt the clay soil would under exposure and cultivation become workable, it could not be rated higher than third class. The water is swamp water, otherwise fresh and good, but signs of iron impregnation were found in Pine creek in section 5. The creeks are either lake-fed or swamp-fed and depend on rainfall. They are not likely to flood to any extent and are not available for water-power even on the largest streams. Fuel is the small timber covering the township, sufficient for local use for a few years. No coal, lignite, stone or other minerals were observed, and no game was seen.—*L. R. Ord, D.L.S., 1907.*

66. The trail from Athabaska Landing to lac la Biche crosses the southeast corner of this township and is in fair condition. The soil is rather poor being composed of sandy ridges and muskegs and partly covered with spruce swamps and would be suitable for mixed farming when drained. The surface is wooded with poplar and spruce of small size. There is no timber, nor hay. Pine creek crosses the southeast corner and there are a couple of small creeks having their sources in the numerous swamps distributed throughout the township. The climate is good while fuel is plentiful on every section although no lignite veins were observed. There are no stone quarries nor minerals of any economic value. There is very little game.—*J. L. Côté, D.L.S., 1907.*

67. There is no trail to this township except the one opened by me across the township from west to east. The soil throughout is light, but suitable for mixed farming. About twenty-five per cent is muskeg and this lies at the north and south sides of the township. The surface is undulating and is covered with poplar, spruce and willow brush. There is no timber of any commercial value and very little hay land is found in the township. An abundant supply of fresh water is available from the muskegs and several large lakes. The climate appears to be good with no indications of summer frosts. Wood as fuel may be obtained on every section, but no lignite veins, stone quarries nor minerals of economic value were noticed. Moose, caribou and bear were the only game found.—*J. L. Côté, D.L.S., 1908.*

*Range 22,*

60. There are no trails to this township except an old pack trail along the north side of the south branch of Sucker creek and this trail is obliterated in many places. The soil is black loam over clay or sandy clay and is suitable for mixed farming. The surface is slightly rolling and covered with timber consisting of poplar, cottonwood

## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 22—Continued.*

and spruce from six to eight inches in diameter. Along the edges of swamps there are some scattered spruce from ten to fourteen inches in diameter, but not in sufficient quantity for a timber berth. The majority of this timber will be cut in a few years by the settlers farther south. The northwest portion of the township is mostly swamp and muskeg. Good hay is plentiful throughout the township, especially along Sucker creek and a creek shown on the north boundary of section 7. The water is fresh but the supply is neither sufficient nor permanent. A good and permanent supply might be obtained by digging a few feet. The south branch of Sucker creek, a stream from eight to ten feet wide and from one to two feet deep flows in a southeasterly direction through sections 33, 27, 28, 22, 23, 14, 15, 11 and 1. Another stream about the same size flows in a southerly direction across the north boundary of section 7. These streams dry up in summer and freeze to the bottom in winter. The banks are of clay and from three to four feet high and the water will flood the hay meadows only when it is very high. There is no water-power. The climate during the summer was wet and cold with summer frosts. Plenty of timber for building and fuel occurs on every section. There are no stone quarries or minerals of economic value found in the township. Game consists of bear, moose and partridge.—*Hugh McGrandle, D.L. S., 1908.*

64. The surveyed trail from Edmonton to Athabaska Landing passes through the westerly tier of sections; it is a well travelled road. There is also a winter trail from the southwest corner crossing the township to the north of east. It is very little used, and is in poor condition. The soil is a stiff clay except in the swamps where it is covered by the usual swamp vegetable mould. This clay is very tough and could not be placed higher than third class as it will take some years of cultivation to develop into fair land. Much of the surface loam or mould has been destroyed by the fierce bush fires that swept off the heavy growth of timber, of which remains still exist, but a fair growth of grass shows cultivable properties. Tawatinaw river, a stream about fifty links wide, flows in a meandering and slow course at the bottom of a valley a mile wide and over two hundred feet deep through the westerly sections. Some jack-pine groves are found in it while the soil is sandy in places. The remainder of the township is rolling country, being a series of broad valleys or troughs with broad, low separating ridges which run a little east of north, the ridges being clay and the valleys traversed by small creeks with swamp along their borders. The swamps are, as a rule, of small area and appear to be shallow and easily drained. The uplands are covered by small poplar and tall alder and willow, mostly firekilled, though patches of green wood of small size are scattered about. None of this is of any commercial value. In the swamps, spruce and tamarack occur, mostly of small size, usually under four inches diameter, and rarely reaching eight inches, practically of no economic value, except for local purposes. The hay meadows are few and small. The water is a swamp water but otherwise seems to be sweet and good. It is probably altogether derived from rainfall being stored up in the one or two small lakes and the swamps which act as reservoirs. The streams are small, the largest, except the Tawatinaw, being less than ten feet in width, and many of them of local origin. None are of any value for power. The small lakes are swamp lakes and shallow and mud-bottomed. Nothing is known as to summer frosts, but there are settlers gathering in the Tawatinaw valley. The fuel is the small timber that covers the surface, probably available for local use for some years. No coal or lignite beds were seen or heard of. No stone quarries nor minerals were noticed. A few moose tracks were seen, but game was conspicuous by its absence. The township is without doubt suitable for agriculture, and when transportation facilities, such as the railway to Athabaska Landing, develop, it will no

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 22—Continued.*

doubt be settled as the clay will probably prove fertile upon exposure and cultivation. —*L. R. Ord, D.L.S., 1907.*

67. The trail from Athabaska Landing to Lesser Slave lake crosses the southwest corner of this township on the north side of the river, while a good trail goes from the Landing to section 1 on the east side. The part of this township on the west side of the river contains some first class farming land. The soil is composed of about six inches of black loam with a clay subsoil. But near the river it is more sandy. On the east side it is more suitable for grazing purposes. Athabaska river flows through this township; its banks being about two hundred and fifty feet high. Back from it the land is fairly level, and covered with patches of green poplar and willow brush. There is no timber of any commercial value. Two or three hundred tons of hay may be cut in this township beside numerous small sloughs, while along the river banks, there is a good growth of peavine. There is an abundant supply of fresh water from small sloughs, muskgs and the river. The river varies from fifteen to twenty chains in width, with a current of four or five miles an hour. No land is liable to be flooded. No rapids or waterfalls occur in this township. The climate is good, with no indications of summer frosts. Wood as fuel can be obtained on every section but no lignite veins were noticed. There are no stone-quarries, nor minerals of economic value. Traces of moose and bear were seen.—*J. L. Coté, D.L.S., 1908.*

*Range 23.*

61. A good wagon trail connecting Edmonton and Athabaska Landing passes within a half mile and about parallel to the west boundary of this township. Two wagon trails run from the Athabaska Landing trail into this township and thereby makes it easily accessible. One trail passes through sections 18, 19, 20, 28 and 27 and terminates in section 23, the other through sections 7, 8, 9, terminating in section 16. The soil is composed of about six inches of black loam with a clay subsoil and is quite suited for grain growing. The surface of the westerly half of the township is rolling and covered with poplar bush up to six inches in diameter while the easterly half is nearly level and fully three-quarters muskeg. Between the muskgs is found in many places spruce timber of a fair size and quality. Stony creek runs through the northwest corner of this township. The water in this creek is good and also the water in the lakes in the southeasterly part of the township. There is no hay of any account, neither are there water-powers, stone quarries or minerals of economic value. Game is scarce but fuel consisting of good spruce, tamarack and poplar wood is found in abundance throughout the township. The climate and soil are good and there is every reason to believe that the westerly half of the township will be largely under cultivation in the near future.—*R. H. Knight, D.L.S., 1908.*

62. The Edmonton and Athabaska Landing surveyed wagon trail passes northerly through this township. The trail enters in section 6 and then passes through sections 7, 18, 19, 20, 29 and 32. A wagon trail branches from the main trail in section 7 and runs northeasterly through sections 17, 16, 21, 22, 26 and 35 to a saw-mill located about the middle of section 35. This township may be described as gently rolling having a light soil covered with bush. To be more particular in description the following may be said. The westerly tier of sections is broken by the Tawatinaw river valley which ranges in width from one to one and one-half miles and has an average depth of about one hundred and fifty feet. The land along this valley is somewhat light and broken by ravines and small muskgs. The whole valley is covered by poplar up to six or eight inches in diameter, or poplar and willow scrub. The most easterly three tiers of

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 23—Continued.*

sections are composed of about sixty per cent muskeg upon which is found dry and green spruce and tamarack up to six or eight inches in diameter, which is of little commercial value. The remaining forty per cent of land is composed of small patches or ridges of land usually covered with poplar but sometimes with jackpine. The remainder of the township can be classed as somewhat rolling covered with a mixed growth of poplar, jackpine, spruce and tamarack, and having about fifteen per cent muskeg. The soil is somewhat poor being of a sandy nature. There is some good spruce timber on sections 21, 22 and 36, but this timber is being cut under permit, for the use of settlers to the south. At the time of survey (June) there were saw-mills cutting this timber. One mill is situated on section 22; the other is on section 35. Good water is plentiful which can be had from the numerous muskegs or from three or four small creeks running out of the township. Hay is scarce but fuel is plentiful. The climate is all that can be desired; slight summer frosts occurred but did no damage. Stone quarry material is not apparent neither are water-powers or minerals of economic value.—*R. H. Knight, D.L.S., 1908.*

63. The wagon trail connecting Athabaska Landing and the Edmonton district runs through this township passing through sections 4, 10, 15, 23, 26 and 35, and thereby affords easy access to the land as a whole. The southwesterly and northeasterly portions of this township are badly broken by the valley of Tawatinaw river. The soil is good and is well adapted for grazing purposes when once cleared of bush, for, where small openings occur, there is found a good growth of hay or peavine. Generally speaking, the whole township is covered with poplars up to four or five inches in diameter. The northwesterly and southeasterly parts of the township are more level and the land somewhat better in quality, though the easterly part of the southeast portion and the westerly part of the northwesterly portion contains considerable timber and is chiefly muskeg. Tawatinaw river affords an excellent and permanent supply of water. The fuel of the settlers consists chiefly of poplar, though, in a few places, spruce and jackpine are to be had but not to any extent. There are no stone quarries nor minerals of economic value. The climate is good and free from summer frosts which was proved this year by the excellent crops of grain and vegetables grown by the settlers.—*R. H. Knight, D.L.S., 1908.*

64. The Edmonton and Athabaska Landing surveyed trail and telegraph line touch the southeast corner of this township and what is known as the 'River Road' branch of the same trail runs through the easterly tier of sections. Otherwise there are no trails or roads into the township. Tawatinaw river flows through sections 1, 2, 12 and 13. The stream is insignificant and valueless as a water-power. It is very meandering and sluggish from fifty to sixty links wide and three feet deep with silt and mud bottom in a secondary valley of ten to twenty chains wide and thirty to sixty feet deep, in the bottom of the main valley which is about a mile wide and probably over two hundred feet deep. The remainder of the township consists of rolling uplands with a general trend to east of north, separated by wide shallow swamps. The uplands and slopes of the valley are covered with small poplar dry and green and tall willow the whole being a second growth of a heavily timbered tract firekilled a number of years ago. The swamps are spruce and tamarack, generally firekilled by a more recent fire which destroyed also much of the second growth on the ridges. A few groves of green spruce are to be found but generally of small sizes, rarely up to six inches in diameter, and the timber with the exception of some patches of jackpine up to eight inches in diameter in the bench lands of the Tawatinaw may be said to be of no commercial value. The soil with the exception of some sandy bench lands in the valley, is clay on the uplands and numerous knolls that push up through the

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 23—Continued.*

shallow swamps, a very tough hard clay which may at some future date when broken up and exposed to frost and weather make fair arable soil, but at present could not be ranked above third class. There are several small swampy lakes that discharge into small creeks flowing east of north, that being the trend of the valleys and ridges. The water is swamp water, but as a rule good, though it appears to be altogether rainfall as there are no spring creeks, the land being too high. The small creek in section 32 is strongly impregnated and coloured by iron, and a deposit of bog iron ore probably exists in the swamps along the westerly tier of sections. The water-powers are of no value whatever. No hay meadows of any size exist. There is plenty of wood for fuel all over the township. No stone quarries or indication of minerals, except the bog iron mentioned, are to be seen. No game at all was seen, except traces of a few caribou.—*Lewis Redman Ord, D.L.S., 1907.*

65. The trail from Edmonton to Athabaska Landing runs parallel to and within one mile of the east boundary of this township but no trail enters it. The west half of the township is very swampy and has only a few patches of good soil while the east half is of superior quality and is generally second class. The southeast corner is rather hilly but vegetation is abundant. There are no water-powers and no hay. Muskeg creek enters this township in section 5 leaving it on section 36, this creek is ten feet wide and two feet deep, and gives an ample supply of fresh water. The climate is good and there is no indication of summer frost. Wood for fuel can be obtained on every section but no lignite was observed. There are no stone quarries nor minerals of economic value. Game is scarce.—*J. L. Coté, D.L.S., 1907.*

66. The trail from Athabaska Landing to Baptiste lake crosses sections 22, 23, 24, 27, 28, 29 and 30 of this township, and is in very fair condition. The soil is generally a black loam with clay subsoil, except the sections adjoining Athabaska river, which are of a sandy nature and are suitable for mixed farming. The surface is wooded with some patches of scattered scrub. On sections 33 and 34, north of the Athabaska, there is a patch of good spruce from seven to twenty inches in diameter. There is no hay. Athabaska river, flowing through sections 32, 33, 34, 35 and 36, and a few small creeks, give an ample supply of fresh water, but there are no water-powers. The climate is good, with no indication of summer frost. Wood as fuel can be obtained in every section, but no coal or lignite veins were observed in the township. There are no stone quarries nor minerals and very little game.—*J. L. Coté, D.L.S., 1907.*

67. The township is reached by the Government trail from Athabaska Landing to Lesser Slave lake, which was in good condition, and passes through the northeast corner. The soil is light on the whole and slightly sandy. It is suitable for mixed farming. The township is broken up by Athabaska river, but otherwise it is level. About thirty per cent is muskeg and the remainder is brûlé. There is no timber of any commercial value. No hay land was noticed on the east side of the river, but thirty or forty tons might be cut on small sloughs in sections 32 and 31. Fresh water can be obtained from the muskegs, from which small creeks join the river. No land is liable to be flooded. Athabaska river contains no rapids or waterfalls in this township. The climate is good, with no indications of summer frosts. Wood as fuel can be obtained in every section, but no lignite veins were noticed. There are no stone quarries nor minerals of economic value. Indications of moose, bear and deer were seen.—*J. L. Coté, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 24.*

61. The surveyed wagon trail connecting Athabaska Landing with the Edmonton district passes through the easterly portion of this township. In section 11 a fairly good wagon trail branches westerly for three miles to Tawatinaw river. At about the middle of section 24 another wagon trail branches northwesterly and passes through sections 25, 26, 27 and 34, thence into township 62, range 24. With these numerous trails access to this township is easy. That portion of the country lying to the west of Tawatinaw valley is by far the most fertile, and is well adapted for grain growing. The surface is nearly level or gently rolling and slightly sloping towards the valley. There are a number of small sloughs and muskegs, but these will dry when the land is cleared of bush and will become valuable for hay. In places the growth of bush is thick, being poplar up to six and eight inches in diameter, while in other places the bush is not so thick. There is no prairie. The country east of Tawatinaw valley is of a poorer quality for agricultural purposes. The surface is rolling, and towards the northerly part of the township it is inclined to be broken. There are a few level pieces of land, but nothing of any extent. The soil is somewhat sandy and inclined to be stony. Most of the land is covered with poplar up to six inches in diameter, with underbrush of willow, but there is good jackpine timber up to fourteen inches in diameter found on sections 3 and 4, the south halves of sections 10, 23 and 24, the north half of section 14, the northeast quarter of section 15 and the northwest quarter of section 13. The water of the lakes and streams is permanent and is of a good quality. Tawatinaw river, which runs northerly through sections 5, 9, 16, 15, 23, 26 and 35, is of great benefit. This river will provide the settlers with a permanent water supply. In this stream at certain seasons of the year are found jackfish in abundance. There is good wood for building purposes as well as for fuel. The climate is good and well adapted for growing wheat, oats, barley and other cereals adapted to a northern climate. That the climate is good for such has been proven by the settlers for three or four years past. There are no water-powers nor stone quarries, neither are there minerals of economic value.—*R. H. Knight, D.L.S., 1908.*

62. The Athabaska Landing and Edmonton surveyed wagon trail passes through section 1 of this township, thence northeasterly and northerly, keeping about one mile east of the east boundary. A fairly good wagon trail enters the township in the northerly part of section 13, thence it goes southeasterly through sections 12, 11 and 2, thence westerly through sections 3, 4 and 8 to a large meadow on section 8. Another wagon trail enters on section 3, thence passes westerly through sections 4 and 5 to a hay meadow on section 6. Neither of these last named trails are good summer trails, on account of the muskegs through which they pass. In this township the southeasterly four or five sections of land are badly broken by the valley of Tawatinaw river. The soil of these sections is somewhat sandy but in places there is a dense growth of grasses and peavine which makes the land suitable for grazing purposes. The remainder of the township has good soil and is level. The only drawback is the amount of worthless bush now upon the land. When once the land is cleared and drained it will be second to none for growing cereals adapted to a northern climate. A large creek runs southerly through sections 32, 29, 20, 17, 8 and 7, into a lake at the southwesterly corner of the township. Along this creek good hay meadows are available, constituting in all about one thousand acres. The northwesterly part of the township contains about three thousand acres of muskegs. The timber of this township is not of commercial value, being composed chiefly of poplar up to ten inches in diameter. There are small patches of scattered spruce up to twelve inches in diameter. The muskegs are thinly covered with spruce and tamarack up to



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 24—Continued.*

six inches in diameter. There is good water to be had in the lakes and low lying lands. There are no water-powers, neither are there stone quarries or minerals of economic value.—*R. H. Knight, D.L.S., 1908.*

63. The Edmonton and Athabaska Landing surveyed wagon trail is about three miles east of this township, but cannot be easily reached by direct line on account of the valley of Tawatinaw river. The best route at present is by way of a trail which leaves the main trail in section 7, township 62, range 23, and crosses Tawatinaw valley in the southerly part of section 13, township 62, range 24. From here a poor wagon trail was cut through the bush, going northerly through sections 13, 24, 25 and 36 to the southeast corner of this township. From this point a trail runs westerly two miles, thence northerly three miles. Almost one-half of this township consists of muskeg covered with small spruce and tamarack up to six inches in diameter or small willow brush. The remainder of the land is nearly level and has a somewhat sandy soil and clay loam covered with bush of either willow and poplar about eight feet high or poplar up to four inches in diameter. On sections 9 and 16 small bluffs of poplar up to twelve inches in diameter are found. There is considerable hay to be had along the borders of the muskegs and in small sloughs on the higher lands. There is an abundance of good water, but there are no water-powers neither are there stone quarries nor minerals of economic value. Fuel composed of poplar, spruce and tamarack is plentiful. The climate is good, being similar to that of the Edmonton district to the immediate south.—*R. H. Knight, D.L.S., 1908.*

64. This township is situated about six miles west of the road from Edmonton to Athabaska Landing. There are no trails or roads into the township. The middle half of the township is swamp while the remainder is rolling clay uplands, bordering the swamps. The general direction of these uplands and the intervening broad swampy valley is a little east of north, the flow of the water in all cases being to the north. A peculiar feature is the small size of the streams, partly explained by the slight fall between the south and north boundaries, as this is about the watershed between Tawatinaw and Athabaska rivers and also because the swamps act as reservoirs, so that there is little scour of waterways. The swamps appear to be generally shallow, and numerous low knolls of clay appear. This clay both on the knolls and on the bordering uplands is of a very hard and impervious nature scarcely penetrated by the roots of the trees. If broken up and exposed to the action of frost and weather it might in time make arable land, but at present it would be called third class. At one time a growth of timber covered the area, but it was fire-swept a number of years ago, and since that time another fire has killed a great part of the second growth. These fires seem to have destroyed most of the surface loam, as the depth of the hard clay is very slight. The timber on the uplands is small poplar and willow up to twelve feet high, of no commercial value. That in the swamps is spruce and tamarack, mostly *brulé*, though a few patches of, green spruce and tamarack of small sizes rarely up to eight inches in diameter, are still to be found. It is of no commercial value. There are few and insignificant hay marshes though there is fair grazing on the more thickly wooded uplands. The water is swamp water, otherwise fresh and good. The supply is small, dependent on rains and of no value for power. The fuel consists of the timber, which covers the township and which is its only value. There are no rock exposures or minerals to be seen. Game is very scarce; a few caribou tracks were noticed. Even rabbits and grouse are noticeably absent.—*L. R. Ord, D.L.S., 1907.*

65. The only route at present by which to reach this township is by way of a fairly good wagon trail from Athabaska Landing to the south end of Baptiste lake. From



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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 24—Continued.*

there a wagon trail was cut southerly a distance of three miles to this township. The trail enters in section 33, goes south and southeasterly to the east boundary of section 15, thence westerly into section 20. The surface of the easterly half of this township is somewhat level and sloping easterly towards a big muskeg running north and south along the east boundary of the township. This muskeg prevents a shorter summer route from the Athabaska Landing trail. The soil of the easterly half of the township is second class and somewhat easily cleared. The westerly half is rough and broken. Sections 7, 8, 9, 16, 17, 18, 19, 20, 21 and 29 are decidedly rough and broken, with narrow ravines one hundred to one hundred and fifty feet deep. The land throughout the township is covered with bush varying from light willow and poplar scrub to spruce timber. Of the latter there are patches usually in small muskegs. The soil of the east half of the township consists of about six inches of black loam with a clay subsoil. The westerly half is somewhat lighter soil and inclined to be a sandy clay loam. There is good water but it is somewhat scarce in the easterly parts of the township. Fuel is abundant, consisting chiefly of poplar wood. There are no stone quarries neither are there water-powers nor minerals of economic value.—*R. H. Knight, D.L.S., 1908.*

*Range 27.*

62. The trail from Edmonton leads through Morinville and Edison to township 61, from here there is only a rough trail to township 62 which was impassable with wagons all season. I was forced to take my outfit the remainder of the distance on rafts down Pembina river. The surface is timbered for the greater part, there being some open places covered with more or less willow or poplar scrub. There is a fringe of spruce along the left bank of the river as far north as the south chord, and north of this it broadens out to an average of half a mile in width. On the right bank the fringe extends to about the same distance north, and from this point the timber extends across the east boundary of the township. There are some open sloughs all of which were full of water at the time of survey. The surface is generally level. The Pembina and a number of small creeks flowing into it provide ample water. There are no falls and consequently no water-powers. Considerable hay could be cut in the sloughs if the water was low enough and I am informed that it usually dries up in time for haying, but the total amount available would not exceed two hundred tons of slough grass. The climate was good except for excess of rain and no summer frosts were noted. There are no stone quarries and no coal or other economic minerals were seen. Moose and jumping deer with partridge, ducks and geese are found. A number of squatters along the Pembina have their holdings within timber berth No. 1296 Block I, but very little good timber is embraced in their claims. The more open parts are suitable for mixed farming.—*C. C. Fairchild, D.L.S., 1908.*

*Range 30.*

3. At Dry Fork postoffice the trail to this township leaves the Oil City trail, and follows a new surveyed trail in a southwesterly direction for about three miles. There are two trails, which, however, join again in section 15, township 4, range 30. It then runs in a southerly direction to section 33 of this township. From this section a somewhat rough and, in places, wet trail runs in a southeasterly direction to the south part of this township. A more desirable trail to follow to reach the south sections in the township lies along the Oil City trail to the north side of Pine creek, thence southwesterly along a hard and not very hilly trail to the interior. The soil is a light sandy loam. In section 22 a late crop of oats was cut for feed. A large portion of the township is covered with small poplar and willow as follows:—sections 32, 29,

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## TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

*Range 30—Continued.*

28, 21, 16, 10 and 11, sections 15 and 22 west of Yarrow creek, and the north part of section 2, also in patches over almost all the other sections. The south portion is rolling, cut by the two branches of Yarrow creek. The westerly and southwesterly part is a series of mountain peaks. No timber of any size is found in the township. The chief fuel is wood and must soon be obtained farther west in the mountains. Summer frosts are common. There are no stone quarries. In sections 12, 13 and 14 iron claims have been staked, but little surface indications of mineral are apparent. Little or no game was seen, but fish are plentiful in Yarrow creek.—*W. H. Young, D.L.S., 1908.*

9. A wagon road connecting with a surveyed road crossing a bridge over Oldman river and leading to Pincher creek, passes to the east of Porcupine hills and follows up Beaver creek into this township. The soil is a sand and clay loam and grows hay and peavine, affording good grazing ground for cattle and horses. The surface is rough and hilly, timbered with fir, spruce, balsam and poplar from three to twenty-four inches in diameter, with some open parts in the southern portion of the township. The timber is suitable for building purposes. The water is fresh but the creeks are small and few and the supply is insufficient during the summer. Beaver creek in the eastern part affords a good supply all the year. There are no water-powers. Frosts occurred during the month of July. Wood is the most readily available fuel. No coal veins, minerals or stone quarries were seen. Grouse, partridge and trout were apparently the only game in this part.—*T. A. Davies, D.L.S., 1908.*

9. A good wagon road runs from Macleod, northwesterly to and along Beaver creek and from this a fairly good trail branches off and crosses the Porcupine hills through the northerly part of this township to Oldman river. The surface of this northerly part of the township is very hilly and broken. Two creeks having their sources within the township give rise to two valleys in which lie some excellent grazing and farming land, but the quantity is very limited. One of the creeks runs westerly into Oldman river and the other easterly into Beaver creek. The hills are timbered on the northerly sides with fir, spruce, pine and poplar. A good belt of fir, spruce and pine running from six inches to twenty-four inches in diameter runs through sections 25, 26 and 27 but much of this timber has been killed by fire. The soil in the valleys is a good clay loam with a gravelly subsoil. Little natural hay can be cut but good timothy can be grown. There is an abundance of good spring water but no water-power is available. The climate is the usual pleasant and healthy climate of the foot hills and summer frosts do not seem to trouble the settlers except where the land is very high. The timber on the hills will afford ample fuel for a number of years. There are no stone quarries, and no minerals were seen. Game consisting of coyotes, deer and partridge is to be found, but is not now plentiful.—*C. C. Smith, D.L.S., 1907.*

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 1.*

4. The trails to this township lie through township 4, range 30, west of the fourth meridian. In wet weather they are somewhat soft but in dry weather are very good. The soil is about eight inches of loam, with a sandy subsoil and a great many hills surmounted by rocky ledges. The northerly portion, though very hilly, is suitable for farming only in patches. About two and one-half miles from the north boundary is a ridge about one hundred feet high running east and west, and from this the land slopes north to Pincher creek and south to Yarrow creek (north branch).

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 1—Continued.*

This southern slope is rolling and contains much muskeg land, and is covered with poplar and willow scrub except in patches. Victoria peak lies in section 33, and this and a series of peaks run in a southeasterly direction making that portion of the township totally unfit for settlement. There is a quantity of dry timber difficult of access on the southern side of Victoria peak, but no green timber was seen. There are no hay meadows of importance. The fuel is wood, but in the township to the north, coal in large quantities is available. There are no stone quarries or minerals of economic value. Bears, red deer, bob-cats, lynx and other kindred animals are seen in the township.—*W. H. Young, D.L.S., 1908.*

**5 and 6.** (East outline.) This line passing through a well settled district is easily followed by wagon trails both south and north of the Crownsnest branch of the Canadian Pacific railway. The soil along the meridian is a black loam with clay subsoil, and in places clay. Grain and hay are grown. The surface is generally a hilly prairie, with patches and large clumps of willow brush and poplar. The water is fresh and of sufficient and permanent supply. Summer frosts occur. Wood and coal are available for fuel. A small coal mine is situated in section 8, township 5, range 30, west of the fourth meridian. It was not in operation at the time of the survey. There are no stone quarries or mineral of economic value. Coyotes and prairie-chickens were the only game seen.—*T. A. Davies, D.L.S., 1908.*

**7 and 8.** (East outline.) This line passing through a well settled district is easily followed by wagon trails both south and north of the Crownsnest branch of the Canadian Pacific railway. The soil along the meridian is a black loam with clay subsoil, and in places clay. Grain and hay are grown. The surface is generally a hilly prairie, with patches and large clumps of willow brush and poplar. The water is fresh and of a sufficient and permanent supply. Summer frosts occur. Wood and coal are available for fuel. A small coal mine is situated in section 8, township 5, range 30, west of the fourth meridian. It was not in operation at the time of the survey. There are no stone quarries or minerals of economic value. Coyotes and prairie-chickens were the only game seen.—*T. A. Davies, D.L.S., 1908.*

**61.** The best route for reaching this township is by way of the old Klondike wagon trail from Edmonton as far as the crossing of Paddle river in township 59, range 3, thence by wagon trail northeasterly through this township and townships 59 and 60, range 2 into section 4, township 61, range 2, whence the surveyor's trail continues easterly to the westerly limit of township 61, range 1. This township contains about 10,000 acres of muskeg which is distributed approximately as follows: Sections 3, 4, 5, 10, 11, 13, 14, 23, 24, 25, 26, 27, 32, 33, 34, 35, 36, the south half of section 9 and the north half of section 28. This muskeg is generally covered with small green tamarack up to six inches in diameter. That portion of the township not covered with muskeg is nearly level and has a soil of rich black loam six inches in depth with a clay subsoil. All this land is covered with a growth of young poplars up to five inches in diameter with usually a windfall of young poplars or large dead spruce which makes clearing difficult. There is no timber of any account other than that suitable for small buildings or for fuel of which there is a large quantity. There is no hay. Good water is plentiful in the vast area of muskeg. The climate is good, being similar to that of the Edmonton district. There are no water-powers, stone quarries or minerals of economic value. Indications of moose and bear were plainly seen throughout the township.—*R. H. Knight, D.L.S., 1907.*

**62.** The trail from Edmonton passes via Morinville and Edison to township 61, range 27, west of the fourth meridian and thence a rough bush trail leads down the left

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 1—Continued.*

bank of the Pembina river to this township, but this trail was impassable at the time of survey (July), and I was forced to send my supplies down to the work on rafts by the Pembina. The southerly two and one-half miles is covered with willow, poplar and scattered bunches of spruce on the eastern part, and on the western part by muskegs, or more properly, spruce swamps. The northern part is covered with a heavy growth of spruce and poplar. The surface is level. There is plenty of water in the lakes, creeks and Pembina river but no water-power is available. There is only one hay slough in section 13, and probably not more than one hundred tons could be taken off this. The southeastern portion of the township is suitable for mixed farming although it is all included in timber berth No. 1296, Block I. The climate was good except for excessive rains this season, and no damaging frosts were noted. There are no stone quarries, and no coal or other economic minerals were found. There are a number of squatters in the southeast part of the township, but all their holdings are included in timber berth No. 1296. Ducks, geese, partridge and signs of bear, moose and jumping deer were seen.—*C. C. Fairchild, D.L.S., 1908.*

*Range 2.*

6. This township may be reached by either of two trails from Pincher creek. The Pincher creek to Frank trail passes through the northeasterly portion of the township, while a trail from Pincher creek by way of Mountain Mill postoffice, passes through the southeast corner. Both of these trails are good in dry weather. The eastern sections are mostly settled. The soil is chiefly a clay loam or a black loam with a clay subsoil. The westerly and southwesterly portion is covered mostly with small poplar and willow, except on the hilltops, which have patches of jackpine. There is quite a large hay meadow in sections 7 and 8, consisting of a wild meadow grass. The water is not too abundant as Screwdriver creek dries up in the summer, but excellent vegetables are grown in almost all parts of the township. Beaver creek runs through the southeasterly part, and Southfork river through sections 13, 24, 23, 26, 27, 28, 29 and 30. Frosts are common during the summer. The chief fuel is coal of a soft variety. Some seams are being opened up one in section 4, and another in section 9. There are no stone quarries or minerals of economic value. Deer, bob-cats, grouse and an occasional black bear were seen.—*W. H. Young, D.L.S., 1908.*

12. (North outline.) This township was very hilly and some of the hills showed an elevation of nearly 8,000 feet by our barometer. There is not much timber of any commercial value along this line.—*James Warren, D.L.S., 1908.*

13. This township was reached from Willow creek in township 14, range 1. The trail was fairly good, being nearly all dry with hard bottoms in the streams. There is a good deal of good arable land in this township, the greater part of which is located by settlers who are making a good start in the way of general farming and ranching. There is one large ranch owned by Messrs. Thompson and Reilly who have a large number of cattle and horses. The general surface is rolling covered with clumps of poplar and open patches of prairie. The openings are quite numerous and are taken advantage of by the settlers who have located on some of them. There are some good hay meadows in the northwesterly parts of the township, several hundred tons having been cut this season. The water in the streams is very good, there being no signs of alkali anywhere. There are some timber locations in parts of the township, especially in the northwest portion where some large fir and spruce timber is found that is of commercial value. Also along the easterly slope of a range of hills in sections 9 and 4 there is a good quantity of fir and spruce. There are no streams by which any large

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 2—Continued.*

-water-powers could be developed, as they are all small. The climate is liable to summer frosts. Wood is the only fuel now used, though there is a small outcropping of coal on section 21. There is no stone that would be available for building purposes except on sections 30 and 31, which are quite mountainous and rocky. Game is scarce, almost unknown, but the streams abound in speckled trout, which are very fine indeed. The general appearance and surface indications would lead to the impression that the township is better adapted for ranching than any other purpose, as the summer frosts are liable to cut down any grain crop, but root crops thrive.—*James Warren, D.L.S., 1909.*

60. The best route for reaching this township from Edmonton is by way of the old Klondike wagon trail as far as the crossing of Paddle river in township 59, range 3. From this point there is a fairly good wagon trail leading in a northeasterly direction through this township and township 59, range 2, entering township 60, range 2, at the southeast corner of section 2. The surface of this township is gently rolling and has a good soil of black loam about five inches deep with a subsoil of clay which makes the district suited for mixed farming. There is no prairie, but sixty per cent of the township is easily cleared as compared with most bush and this area is quite evenly distributed. The remainder of the township is rather heavily timbered with spruce and poplar up to eight inches in diameter. On sections 1, 2, 31 and 32 there is some good spruce timber. This, however, would be of no use as a timber limit but would serve the needs of the settlers in the immediate vicinity. There is no hay worth mentioning but the upland feed for stock is fairly good and good water is found in the various small streams. There are no stone quarries nor minerals of economic value. There is no game of any account.—*R. H. Knight, D.L.S., 1907.*

61. The best route for reaching this township from Edmonton is by way of the old Klondike wagon trail as far as the crossing of Paddle river in township 59, range 3; thence by a wagon trail in a northeasterly direction through this township and townships 59 and 60, range 2, entering township 61, range 2 in section 4. The surface of this township is gently rolling or nearly level, and the surface soil is composed of a rich black loam, averaging about six inches in depth. If once cleared of the bush it would be quite suited for mixed farming. There is no prairie and section 4 contains all of the light scrub within the township. There is a good quality of heavy spruce timber to be found on the following sections, 6, 7, 8, 17, 18, 19, the north half of section 5, the south half of section 20, the west half of sections 9, 16, 27, and the east half of section 28. The remainder of the township is mostly covered with poplar up to eight inches in diameter and in many places with young spruce of the same age. Sections 11, 12, 13 and 14 are largely covered with windfall of young poplar. There is no hay to be found, but good water can be secured from the small creeks, swamps or muskegs, but none of these are numerous. An abundance of good wood furnishes the chief supply of fuel. Coal is likely to be found near the surface but does not outcrop. There are no stone quarries nor minerals of economic value. The only game consists of moose and bear, both of which are plentiful.—*R. H. Knight, D.L.S., 1907.*

*Range 3.*

5. The westerly part of this township is reached only by pack trail, which I cut from an old logging camp in section 1, township 5, range 4. Wagon trails run across the southern portion and to about the centre of the township where oil wells are being sunk. It is covered with timber, but the northern portion almost to the north boundary of section 19 has been burned over, and most of the timber is dead. However

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 3—Continued.*

there still stands a goodly quantity of spruce and pine, along the west boundary. It is extremely mountainous along the line and is cut by numerous small mountain streams. The soil is chiefly a clay loam. No waterfalls, minerals, or stone quarries are located in this part of the township. No coal was seen. Black bear were encountered here on a few occasions.—*W. H. Young, D.L.S., 1908.*

5. The soil in the valleys of this township consists of black loam with clay sub-soil and on the hills and mountains clay and gravel occur. The valleys and low hills are very rich and capable of producing large crops of hay, oats and hardy vegetables. Cattle and horses will do well owing to the large growth of grass and abundant water supply. There are also large tracts of land, heavily wooded, which I believe have already been sold to lumbermen. Petroleum is also present and several companies are operating in the valley of Southfork river. The valleys are fairly level, in some places rolling, but the township generally is rough, hilly and mountainous. Hay can be cut wherever open and level prairie ground can be found, but there are no extensive tracts of hay lands. The water supply consists of the finest of fresh water, and the supply in all the streams is permanent as they are fed by springs from the hills and mountains. Southfork river is the largest stream, running northerly throughout the entire length of townships 4, 5 and part of township 6, range 3. It is fed by large tributaries from the east, west and south coming from the mountains and it drains a very extensive tract of country. Its width averages from fifty to one hundred feet and the depth from two to twenty feet. The volume of water is very large and the current runs at rates varying from four to ten miles an hour, according to the height of the water, which is highest about the month of June and lowest about February. During extremely high water the lowest lands along the Southfork are liable to be flooded, but this is not likely to occur often. A dam could be constructed in this stream at some point where the river is narrow and the banks high, of which there are many good places, and probably five hundred horse-power could be developed. The altitudes vary from 4,700 to 7,900 feet. The rain and snow fall is very great in this region, this year particularly. The most lasting storms, accompanied by the greatest precipitation came from the northeast, and the thunder showers of short duration from the west and southwest. There are a few summer frosts, but no doubt with the opening of the country these will no longer occur. Coal is to be found underlying the conglomerate rock which outcrops in many places along Southfork river. There is also large quantities of wood consisting of pine, spruce and fir. There are no stone quarries. The minerals consist of those already mentioned, coal and petroleum, neither of which has yet been developed. Placer gold has been found on Gladson creek, but not in large quantities. There are a number of fur bearing animals to be found, such as beaver, marten, foxes, mink, weasels, bears, coyotes and lynx. There are also a few deer, sheep, goats and elk. Trout is plentiful in all the streams.—*W. F. O'Hara, D.L.S., 1907.*

6. The trail to this township lies through township 6, range 2, leaving the Pincher creek to Frank trail at the correction line on the north boundary of section 32, township 6, range 2. A very good trail lies in a southwesterly direction, crossing the fords on Southfork river. This trail may be followed to the westerly boundary of the township. Another trail, when the ford is impassable, runs over high hills and through creeks to avoid cut banks and joins the above mentioned trail in section 15. The whole township is very mountainous. Only in small patches is the land arable. Much of the township was burned over some years ago, and what timber there was has died. Small poplar and some jackpine are found in patches. On the south side of the river, in sections 6 and 7, some dead timber, fourteen inches to eighteen inches in diameter,



## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 3—Continued.*

still stands. Both coal and wood for fuel are found in abundance. In sections 8, 9 and 10 veins of coal are being opened up. There are no stone quarries or minerals of economic value. In section 14 is a small hay meadow. Water in abundance is obtained in Southfork river, and its tributaries supply a great quantity of trout. Waterfalls and swift rapids in every section through which it passes might be used for water-powers. Some red deer and grouse and an occasional bob-cat and black bear were seen in the township. During the spring months, and until nearly August 1, Southfork river is a roaring torrent. It is on an average four chains wide and four to five feet deep. The stream is confined to very well defined banks, but overflows the low lying land at high water. Summer frosts are common almost every month, although excellent vegetables are grown in sections 24 and 25.—*W. H. Young, D.L.S., 1908.*

8. A wagon road leading from Frank to Lille and a lumber trail branching off to the north immediately west of Lille enabled us to survey the lines that were needed in the western portion of this township. A trail branching off to the north from the main trail between Lundbreck and Frank, following along the east boundary of townships 7 and 8, was followed into that part of township 8 east of the Livingstone range of mountains. That part of the township to the west of Livingstone range is rough and mountainous, with the exception of the valley where the mining village of Lille is situated in section 18. The soil consists of clay. Hay in small quantities is cut from the land around Lille. Creeks afford a fresh and permanent supply of water, Caudon creek and Gold creek being the two largest ones, they being from three to six feet wide and from one to three feet deep. There are no water-powers. Wood and coal are easily available for fuel. The timber consists of spruce, balsam, pine and poplar. Some small lumbering operations were being carried on in sections 30 and 19. Coyotes, grouse and partridge were the only kind of game seen. The part of the township to the east of the range is hilly and much more open, with clumps of poplar and willow brush. It is more suitable for cattle ranching than for agricultural pursuits. The climate is subject to summer frosts. The rock formation is usually slate capped with limestone or limestone only.—*T. A. Davies, D.L.S., 1908.*

9. The soil in this township is a black loam with a clay subsoil, and in places clay. Sections 14, 23, 25, 26 and 35 are rolling, with clumps of poplar and willow brush. Parts of these sections would be suitable for agriculture. A large portion of section 26 is marshy, and section 25 is mostly hilly. The country is more suitable for cattle ranching than for any other occupation. Hay grows throughout sections 14, 23, 25, 26 and 35. It had been cut and staked by three men who had settled there. Two main creeks give a fresh and permanent supply of water. They average from three to five feet in width, from six inches to two feet in depth and flow approximately two miles per hour. There are no water-powers. Summer frosts occur. Snow fell during September and October to a depth of two feet on the level. Wood is easily available for fuel on the slopes of Livingstone range. No stone quarries nor minerals were located. Deer, coyotes, grouse and partridge were seen, also abundance of trout.—*T. A. Davies, D.L.S., 1908.*

10. The eastern portion of the township where the survey was located is hilly and for the most part covered with spruce, balsam, fir, pine, poplar and willow brush. Fir, balsam and spruce, from one to two and one-half feet in diameter, are situated in section 23 and the north half of section 14. Hay grows in sufficient quantities for grazing only. The water supplied by the creek, is fresh and permanent. They average four feet wide, one foot deep and a current from two to three miles per hour. There are



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## TOWNSHIP'S WEST OF THE FIFTH MERIDIAN..

*Range 3—Continued.*

no water-powers. The climate is subject to summer frosts. Snow fell in September and October to a depth of two feet. This disappeared within a week. Wood is readily available for fuel. There are no stone quarries or minerals of economic value. Deer, coyotes, grouse and partridge were the only game seen. No settlers have located in this township where the survey was made.—*T. A. Davies, D.L.S., 1908.*

12. (North outline). The township was very hilly and some of the hills showed an elevation of nearly 8,000 feet by our barometer. There is not much timber of any commercial value along this line.—*James Warren, D.L.S., 1908.*

12 and 13. A good wagon trail following the north fork of Oldman river, and connecting with trails leading to Pincher creek and Cowley, was our route into these townships. The soil as seen in the few places where pits could be dug was either clay or a clay loam, usually mixed with gravel and rock. The surface of the country is rough and mountainous, timbered with spruce, balsam and pine, averaging from three to eighteen inches in diameter, also poplar, alder and willow brush. On the north and east slopes the ground is usually covered with windfall. The open parts lie along the summits of the ridges and for a short distance down the hillsides. Hay grows throughout the valleys, though not in sufficient quantity or quality for cutting, yet it affords grazing for horses and cattle. A small amount of hay is cut and stacked in the valley of Livingstone river. The water of the creeks is fresh and gives a sufficient and permanent supply. They are, with the exception of Livingstone river, from two to ten feet wide, one to three feet deep and flow from one to four miles per hour. Any falls or rapids occurring are small and unimportant. The winters are severe with the temperature frequently at thirty and forty degrees below zero. Snow falls during some winters to a depth of three or four feet. Some years the fall is not sufficient for sleighs. Summer frosts occur frequently. Wood is the most easily obtained fuel, although coal seams were seen in section 21, township 13 and section 29, township 12. The rock formation is slate and limestone. There are no stone quarries nor indications of any mineral of economic value. Game consists of deer, lynx, bear, coyotes and a few marten, grouse, partridge and ptarmigan.—*T. A. Davies, D.L.S., 1908.*

61. The best route by which to reach this township from Edmonton is by the old Klondike wagon trail as far as section 19, township 60, range 3, thence by a poorly constructed wagon trail northeasterly which enters this township in section 4. The surface of this township is gently rolling, and the surface soil is composed of black loam, averaging about five inches deep, with a subsoil of clay, if once cleared of bush it would be well suited for mixed farming. There is no prairie, and sections 3 and 4 contain all the light scrub in the township. There is a large quantity of first class spruce and tamarack timber on sections 1, 2, 10, 11, 12, 13 and 14. The remaining sections are covered with poplar up to eight inches in diameter, accompanied in many places by young spruce of the same age. There are muskegs adjacent to Shoal lake, on the north. Sections 30, 31, the west halves of sections 29 and 32 are practically all muskeg. These muskegs are nearly always covered with young spruce or tamarack up to six inches in diameter. The only hay found is that growing about the shore of the lake. There are large quantities here, but the ground is generally rough and wet, which would make the cutting of the hay difficult. The water of Shoal lake is good, also that of Shoal creek, which runs through the township in a northeasterly direction from the lake. The chief source of fuel is the abundance of good wood. Coal is likely to be found near the surface, but does not outcrop. There are no stone quarries nor minerals of economic value. Game in this township is limited to moose and bear, of which traces were frequently seen.—*R. H. Knight, D.L.S., 1907.*

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

## Range 4.

8. The soil in this township consists of clay. The country is not suitable for agricultural purposes as the surface is very rough and mountainous, especially in the northern part, and covered with spruce, fir, balsam, pine and poplar, averaging from 6 to 30 inches in diameter. The sidehills are in many parts covered with windfall. Water is fresh and the supply permanent. There are no water-powers. Frosts occur frequently throughout the summer. Wood and coal are both available for fuel. Coyotes, grouse, partridge and trout were seen.—*T. A. Davies, D.L.S., 1908.*

12. The country through which this line runs is very rough. Only a small portion of it would be fit for ranching or any other economic purpose. We did not find any trace of any mineral along this line, as the country was so rough and rocky. There are a few fine streams on which good water-powers could be developed, but they are so far away that they would not be of any value at present. The timber is also small and of no commercial value.—*James Warren, D.L.S., 1908.*

12. (North outline.) This township was very hilly, and some of the hills showed an elevation of nearly 8,000 feet by our barometer. There is not much timber of any commercial value along this line. Livingstone river, a tributary of Oldman river, crossed the line in section 36. This is a fine stream, on which a very powerful water-power could be developed. All the other streams are small.—*James Warren, D.L.S., 1908.*

45. A wagon trail from Bluff Centre postoffice to Buck lake runs through the northerly part of the township and though in the spring almost impassable, it is at other seasons frequently travelled. Spruce muskegs with jackpine and poplar ridges comprise nearly the whole of the township, the soil on the ridges being generally clay covered in the northwest portion with six inches of black loam. The country is generally rough and broken, the township being a watershed from which Blindman river and its west branch, and a number of tributaries of Modeste creek have their sources. Timber suitable for settlers' purposes only is found throughout nearly the whole township consisting of jackpine, poplar and spruce to ten inches in diameter. There are no large hay sloughs but good pasturage is found on the ridges. Creeks are numerous and the water is of fine quality. Blindman river rising in the west and flowing easterly through the middle of the township is twelve feet wide and two feet deep when passing through section 13. The west branch of Blindman river, rising in the southwest, is only two feet wide and six inches deep when flowing south through section 4. Neither river admits of water-power development. The climate is similar to that of Edmonton and summer frosts are liable to occur. No indications of coal were found but plenty of timber for fuel is available. No stone quarries or minerals were located. Game, which is very scarce, consists of moose, bear, deer, prairie-chicken and partridge.—*H. L. Seymour, D.L.S., 1908.*

46. The wagon trail from Bluff Centre postoffice to Buck lake just enters the southwest corner of the township and from this a wagon trail, fairly passable in dry weather, has been cut northerly following along Modeste creek and joins in the south of township 47 a wagon trail leading to Wetaskiwin. To the south the township is generally quite heavily timbered, poplar, spruce and balsam to fifteen inches in diameter being found in roughly rolling country. The middle of the township is more open, being covered with small poplar and willow and is fairly level; this portion is suitable for homesteading, especially section 12. To the north the township is very heavily timbered with spruce, jackpine, balsam, tamarack and poplar, and the country is very roughly rolling. Timber berth No. 1,306 occupies the northeast corner of this township and has spruce to twenty-six inches in diameter with large poplar and some

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 4—Continued.*

birch. The soil is generally clay with very little top soil. No hay meadows of any size exists, but in the middle of the township good pasturage will generally be found. The main branch of Modeste creek rises in the north of township 45 and when entering this township in section 6 is four feet wide and one foot deep. In section 34 this stream is forty feet wide and from two to three feet deep, being joined in this section by a tributary from the east, which, rising in township 45 enters section 1 two feet wide and six inches deep and is nearly as large as the main branch before the point of confluence. In the north of the township the banks of both these branches are often over fifty feet in height. Many small creeks are tributary to the two main streams and the quality of the water in this township is excellent. The climate is similar to that of Edmonton. Small veins of lignite probably occur along the banks of Modeste creek, but plenty of fuel consisting of dry and green timber is available. No stone quarries or minerals were located. Game, which is very scarce, consists of moose, bear and deer.—*H. L. Seymour, D.L.S., 1908.*

61. The only route by which to reach this township from Edmonton is along the old Klondike wagon trail which enters the township in section 3. The surface is nearly level or gently rolling, and the surface soil where muskegs are absent is composed of a black loam, about five inches deep, with a subsoil of clay, which if once cleared of bush would be quite suited for mixed farming. There is no prairie, and sections 3, 4 and 5 contain all the lighter scrub within the township. There is good spruce timber found on parts of sections 1, 2, 3, 5, 6, 23, 24, 25 and 26, but in no case is a section completely covered with good timber. A thick growth of young poplar and spruce, up to six inches in diameter, with an undergrowth of willow, extends over sections 19, 27, 28, 29 and 30. A large muskeg extends across the township from section 18 to Shoal lake in section 13. The muskeg varies in width from one to two and one-half miles and comprises about 5,000 acres. It is absolutely impassable by horses except when frozen. Another muskeg extends from section 31 easterly across the township and terminates in range 3. This latter muskeg extends over sections 32, 33, 34, 35, 36, parts of 25 and 27 as well as a large area north of this township, the extent of which is not yet known. Shoal lake which has an area of about 2,000 acres in township 61, range 4, extends over parts of sections 1, 2, 12, 13 and 14. The water of this lake is good and large quantities of hay grow along its shore, but the saving of this hay would be difficult owing to the rough bottom and the low lying wet shore. The chief source of fuel is the abundance of good wood. Coal is likely to be found near the surface but does not outcrop. There are no stone quarries nor minerals of economic value. The climate is fair, but owing to the low lying muskegs the higher lands might be subject to slight summer frosts. Game in this township is limited to moose, of which traces are frequently seen.—*R. H. Knight, D.L.S., 1907.*

*Range 5.*

22. This township was reached by travelling southwesterly along a trail passing north of Priddis. The trail is very wet and difficult to travel on, especially in the spring. The soil is generally light and loamy, especially on the hills, and in places it is quite sandy and would not be suitable for farming. There are some localities that would be suitable for ranching and there are also some good hay meadows. The surface is generally scrubby or covered with small pine and poplar but none of any commercial value. The water is good, no alkali being seen or noticed in any of the streams. Elbow river crosses a portion of sections 34 and 33. This is a strong and heavy stream, but has no available water-powers. The stream is apt to rise very high and would be destructive to any dam that would be built. Timber could be rafted down the river

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 5—Continued.*

in ordinary water. The climate seems favourable and there are no indications of summer frosts. There are no quarries, though in some places fixed rock comes to the surface. No minerals of any kind were seen. Wood fuel is quite plentiful. The surface is very hilly and rough, there being very little low or flat land in the township except on parts of sections 26 and 27.—*James Warren, D.L.S., 1908.*

23. This township was reached by trail from township 22. The soil in this township is generally light, but in some places there is good clay. The surface is covered with bluffs of spruce, poplar and jackpine, scarcely any of which is of any commercial value, as most of the large timber has been cut. The soil and general features would be more adapted for ranching than for general farming, which does not appear to have been tried by any of the people who had settled on parts of this township. There does not appear to be any hay land or meadows. The water is good; the streams and creeks are all fresh with no trace of alkali. The climate seems to be good but there would likely be danger of summer frosts. There is plenty of wood fuel but no indications of coal, stone or other minerals are to be seen. No game of any kind is to be seen anywhere. The general indications show that part of the township might be used for ranching purposes, as there appears to be plenty of feed and good water.—*James Warren, D.L.S., 1908.*

45. The wagon trail from Bluff Centre postoffice to Buck lake runs in a westerly direction about a mile north of this township from which an old pack trail branching southeasterly into the township enters in section 33. The soil, a clay subsoil generally covered with black loam from two to eight inches in depth, is in parts suitable for agricultural purposes. The surface of the country is, however, quite rough and broken, covered with spruce, poplar and jackpine to ten inches in diameter suitable for settlers' purposes, except to the north, where the country is more open with windfall and willow scrub, and the northwest sections are probably the most desirable for settlement. There are no large hay meadows, but good pasturage can be found in most of the sections. Water is of fine quality, and the creeks are numerous. The main tributary of Buck lake (Mink creek) has its source in the southeast corner of the township and leaves in section 19, being there ten feet wide and one foot deep with a valley from fifty to one hundred feet and up to half a mile wide. Two smaller creeks, also tributary to Buck lake, leave the township in sections 32 and 33, respectively. The climate is similar to that of Edmonton. No indications of coal were found in this township, but plenty of timber for fuel is available. No stone quarries or minerals were located. Game consists of moose, bear, deer and partridge.—*H. L. Seymour, D.L.S., 1908.*

46. The wagon trail from Bluff Centre postoffice to Buck lake runs westerly through the southerly sections of the township and reaches Buck lake in section 7. In section 5 a wagon trail leading to the mouth of Brazeau river, on the Saskatchewan, branches from the Buck lake trail. Throughout the township a number of old Indian pack trails lead easterly and northerly from Buck lake. The township is fairly level timbered to the north with poplar and spruce to fifteen inches in diameter and some jackpine, balsam and birch. The westerly portion of section 19 is occupied by timber berth No. 970, where spruce up to twenty inches in diameter with good-sized poplar, balsam and birch is found. Timber berth No. 962 probably occupies most of section 31, spruce to fifteen inches in diameter being found there. The southerly portion of the township is more open, with spruce and tamarack muskeg and dry and green patches of spruce, poplar and jackpine with willow brush. The majority of the sections are suitable for settlement the soil generally being four inches of black loam with clay subsoil. No large hay meadows were noted. Buck

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 5—Continued.*

lake occupies parts of sections 6, 7, 30 and 31. There are a number of small creeks tributary to this lake, the quality of the water being excellent. Muskrat creek, six feet wide, one foot deep, enters the township in section 4 and Buck lake in section 7. The development of water-power in this township is impracticable. The climate is similar to that of Edmonton. Plenty of dry and green fuel for timber is available, but no coal, minerals or stone quarries were located. Tracks of moose and deer were noted and in Buck lake whitefish and jackfish are found.—*H. L. Seymour, D.L.S., 1908.*

53. The only possible way of reaching this township is by pack trail in the summer months from Lake St. Ann settlement or Entwistle. By using sleighs in the winter, a very good road has been opened up which to a great extent follows the lakes, rivers and sloughs. As it is possible to take a heavy load the whole distance, it is found that this is the most economical way of taking supplies into this country. From the report furnished the Department by Mr. Ross, D.L.S., in connection with the survey of the thirteenth base line, I expected to be able to use wagons as far as Chip lake, but this I found to be impracticable, at least in the earlier part of the season owing to continuous wet weather, and the abnormal traffic over it of teams employed in the construction of the Grand Trunk Pacific railway. Although the contractors, Messrs. Foley Brothers and Stewart, were continually improving and changing this road especially the portion south of Chip lake, it was impossible for a team to take anything more than an empty wagon over it. There are two pack trails as far as the 'Big eddy,' on McLeod river; one is known as 'Jock's' trail and the other the 'Jasper' trail. Both these trails cross the Pembina at the old crossing, or the 'Jasper crossing,' but the former turns north of Chip lake as far as township 56 and thence in a southwesterly direction to the 'Big eddy.' The latter trail, however, runs almost due west, passing south of Chip lake and is by far the shorter trail. I found, however, that the first mentioned trail was the more suitable, although two days longer, owing to its being fairly dry in rainy weather, also on account of an abundance of feed for horses at all seasons. I found the 'Jasper' trail very bad and almost impassable owing to a great extent to its crossing a large number of wide and soft muskegs, long and continuous stretches of fallen timber and also to the unsatisfactory condition of bridges. From the 'Big eddy' the trail follows along McLeod river. I used this trail in the survey of this township as far as 'The Leavings,' but from that point I found it necessary to open a new trail about eight miles north and east to the centre of the township. From Lake St. Ann settlement, with a load, it took thirteen days to reach the camp and three weeks for a round trip. The soil, generally speaking, throughout this township is not of the very best, in fact the greater portion of it is of an inferior quality. The higher ground has evidently been subjected to a succession of very severe fires, which have burnt off all the top soil or loam and baked the clay subsoil to such an extent that I found it very difficult to excavate for pits. The clay in most cases is of the boulder variety, which would make it very difficult to cultivate. There are large areas of muskegs, however, which, if drained, would make very desirable land. The townships, on the whole, would be suitable for grazing, and here and there sufficient land could be found for mixed farming where the surface is not too rough. The township, as a whole, might be described as being covered with scrub, with patches of timber and thick small jackpine. The timber is found in the muskeg areas which lie to the north of the lakes in sections 7 and 8, and practically extending east and west across the whole township. There is also a belt of timber in the northwesterly portion of the township. The timber in this township is principally spruce, although a little tamarack and jackpine is to be found. The spruce would average about twelve inches in

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 5—Continued.*

diameter and the other timbers somewhat smaller. None of the timber areas are of sufficient size or quantity to be of any great commercial value, and should be reserved for the benefit of the settler. There are no hay sloughs or marshes of any extent in this township, the only hay which is found is a narrow strip usually around lakes and sloughs. The ground is usually of so marshy a nature that hay can only be cut with a scythe. The water in the vicinity is of the very best and free from alkali. The chain of lakes and spring creek which run to the northwest into Athabaska river might be mentioned, as they abound in trout and other fish. The climate is similar to that of the Edmonton district, but is probably subject to earlier frosts, also to excessive hail storms which follow the valley of the McLeod and Athabaska rivers. The fuel at present which can be most readily procured would be wood, but there is an unlimited supply of coal in the valley of McLeod river within a comparatively short distance.—*A. E. Farncomb, D.L.S., 1908.*

61. The only route by which to reach this township from Edmonton is along the old Klondike wagon trail, which enters the township in section 12. The surface is quite varied. The southerly two tiers of sections are somewhat level and contain a considerable amount of muskeg; the next two tiers are quite rough and broken, while the northern portion is cut up by Athabaska river, its valley and the numerous adjacent ravines. The soil is good, generally consisting of four to six inches of black loam with a clay subsoil. The township is wooded throughout by either muskeg timber, upland spruce timber or the ordinary upland growth of poplar, up to six inches in diameter, with underbrush of willow and hazel. Sections 1, 2, 3, 4, 5, 6, 11 and 12 contain most of the muskeg land. Sections 3, 4, 5, 6 and that portion of the township lying north of the Athabaska contain most of the best quality of large spruce timber, while the remainder of the township consists of land covered by poplar with undergrowth of willow and hazel. There is no hay of any extent within the township, but there is good water everywhere. Wood fuel is abundant. Coal is likely to be found comparatively close to the surface, but does not outcrop. There are no stone quarries nor minerals of economic value. The climate is good, but slight summer frosts may occur owing to the dense growth of bush and the large muskegs in township 61. range 4. There is no game of any account.—*R. H. Knight, D.L.S., 1907.*

*Range 6.*

45. A wagon trail from Buck lake to the Saskatchewan opposite the mouth of Brazeau river runs in a westerly direction about half a mile north of this township and though but a new trail is quite passable; it is occasionally travelled in dry weather and makes a good winter trail. Over half of the township to the south and west is heavily timbered, comprising timber berth No. 1243, spruce up to thirty-six inches in diameter and good sized poplar and jackpine being found. The northerly portion is more open, with spruce and tamarack muskegs, and hay sloughs with some brulé and windfall. The northeasterly portion is quite rough and covered with dead standing and fallen timber. The soil is generally sandy or clay, but in the timber is covered with black loam up to six inches. There is good hay land in sections 29 and 30 consisting of a large slough with some windfall and willow brush. Creeks are numerous and the water of good quality. Mink creek runs through the northeast part of the township and when crossing the north outline in section 32 is eighteen feet wide and two and one-half feet deep, being joined in section 26 by a tributary from the south, twelve feet wide, one and one-half feet deep, but neither of these creeks will admit of development of water-power. The climate is similar to that of Edmonton. No indications of coal were



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 6—Continued.*

discovered but plenty of fuel consisting of green and dry timber is available. No stone quarries or minerals were located. Game, which is very scarce, consists of moose, bear, deer, ducks and partridge.—*H. L. Seymour, D.L.S., 1908.*

46. The wagon trail from Buck lake to the Saskatchewan opposite the mouth of Brazeau river runs in a westerly direction across the southerly part of the township. It is quite passable in dry weather and makes a good winter trail. The southwesterly part of the township is quite rolling, lightly timbered with poplar and willow brush, with some spruce muskegs. Buck lake, five miles long, from two to three miles wide and about twenty feet deep, occupies most of the easterly portion of the township, but timber berth No. 970 extends into section 24 and timber berth No. 962 probably occupies a portion of sections 35 and 36; in both these limits spruce from fifteen to eighteen inches in diameter is found. Two to three miles northwest from Buck lake, good timber consisting of spruce, tamarack and balsam, up to eighteen inches in diameter, is found. Timber berth No. 963 enters section 33, where spruce and poplar from six to eighteen inches in diameter grows along the west side of Buck lake near the middle of the township; spruce and poplar up to eighteen inches in diameter might be suitable for a small timber berth. Along the west side of Buck lake, to the north, the country is quite level and fairly open, with brulé and willow scrub. The soil is generally a few inches black loam with clay subsoil. To the southwest of Buck lake around lakes Nos. 1 and 2 good slough grass is found making good winter grazing for stock. Other small hay meadows are found around the lake. Mink creek entering this township in section 2 is twenty-five feet wide and four feet deep; it flows into lake No. 2 and then into Buck lake. Other small creeks with excellent water run into Buck lake but Washout creek, five feet wide and two feet deep, flows westerly from this township in section 7 towards Wolf creek. The climate is similar to that of Edmonton. No indications of coal were discovered but plenty of fuel consisting of dry and green timber is available. No stone quarries or minerals were located. Game, which is very scarce, consists of moose, deer, bear, ducks and partridge, and in Buck lake, whitefish and jackfish abound.—*H. L. Seymour D.L.S., 1908.*

61. This township is reached by the old Klondike trail to Holmes Crossing post-office, thence via pack trail. The trail is nearly impassable during most of the summer season for anything but light wagons or pack horses. The soil is generally sandy and fit for some mixed farming when cleared, all south of the river being timbered with jackpine and spruce averaging sixteen inches in diameter, and poplar eight inches in places. The north side of the river is poplar averaging four inches. There is no hay, but there is plenty of good water in Athabaska river and the creeks and marshes. The Athabaska averages fifteen chains in width, six feet deep and has a current of three to four miles an hour. There is no danger of flooding and no available water-powers. Summer frosts were observed but did little damage. Wood is plentiful but no coal or other economic mineral was observed. There are no stone quarries. Moose, caribou and bear signs were plentiful. All the township south of Athabaska river is timbered sufficiently for reservation as a timber limit.—*C. C. Fairchild, D.L.S., 1908.*

62. This township is reached by the Chalmer's or Klondike trail which is good in winter but almost impassable in summer. The soil is generally good, suitable for farming except where swampy. The surface is all timbered, except sections 1, 2 and 3, where there is some open country near the site of old Fort Assiniboine. There is some timber of value along Freeman river and in section 1 on Athabaska river. The latter is in timber berth No. 1397. The timber is spruce, averaging eighteen inches in diameter but outside the limit there is not enough to reserve in any one place.



## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 6—Continued.*

There is a little hay on the open flats but all is embraced in the squatters' holdings. There is plenty of good water in Freeman and Athabaska rivers. Freeman river will average two chains in width and two feet deep and has a current two to three miles an hour. There is little danger of flooding in this township. There is no available water-power. Summer frosts did no damage this season. Wood is the only fuel seen. No coal or other economic minerals were found and there are no stone quarries. Some moose, caribou, jumping deer and bear tracks were seen. There are about twelve squatters in this township, and a considerable area of land suitable for settlement can be found in the other parts of the township. The great drawback is the difficulty of transportation. The settlers are all enthusiastic as to the climate, soil, &c., but feel the need of improved transportation facilities.—*C. C. Fairchild, D.L.S., 1908.*

*Range 7.*

49. This township is reached by a good wagon road leading from the Tomahawk settlement through township 50 and entering this township in section 36, following the west bank of the Saskatchewan to section 4. Two roads branch off this trail heading west, one in section 36 and the other in section 16. The northeast portion of this township is fairly open, rolling land, being an old brûlé overgrown with small poplar and willow. The soil is good and suitable for farming. Some heavy spruce and poplar occur on the south side of the Saskatchewan, also in sections 16, 17, 21, 20, 29 and 30. These areas have been taken as timber limits. The balance of the township is covered with windfall and burnt timber with thick growth of poplar and willow brush. Except in the heavy timber, where a greater depth of soil is found, the soil is mostly clay, with in places a few inches of black soil. It is suitable for agricultural purposes. The country is well watered by several large creeks emptying into the Saskatchewan. This river runs through the easterly part of the township. Some rapids, known as Rocky rapids, are located in this township. The fall is not very great, being only noticeable at low water, and has no value as a water-power. Hay is scarce. Wood for fuel can be found in every quarter section. There are no minerals, water-powers, stone quarries or coal in this township. The climate is similar to that of Edmonton. Game consists of moose, deer, coyotes, foxes and partridges.—*M. Kimpe, D.L.S., 1908.*

50. A wagon road from Tomahawk settlement enters this township in section 24 and running south leaves it in section 1. A trail to Pembina river branches off in section 14. The former is fairly good but the latter can be used only in winter. The easterly third of the township is rolling land, fairly open, with scattered poplar and underbrush. The soil is good and fit for agricultural purposes. In sections 11, 15, 16, 21 and 22 some heavy timber occurs, being spruce and poplar to eighteen inches in diameter. This area is included in a timber limit. The balance of the township is covered with poplar and cottonwood from six to fourteen inches in diameter. The soil is good, being on an average four inches of black loam on a clay subsoil. It would be suitable for farming after clearing the timber. This township is well watered by some large creeks, emptying into Saskatchewan river. Hay is scarce, occurring only along the water-courses. There are no minerals, stone quarries, coal or water-powers in this township. The climate is similar to that of Edmonton. Game consists of moose, deer, foxes, coyotes and partridge.—*M. Kimpe, D.L.S., 1908.*

51. This township is reached by a good wagon road leading from the Tomahawk settlement to Saskatchewan river, in township 49. A winter road branches off from the above road near the south boundary of section 1 and runs in a northwesterly direction across this township to Entwistle on the Grand Trunk Pacific railway. This township

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 7—Continued.*

is heavily wooded with poplar and cottonwood up to sixteen inches in diameter. Spruce and tamarack are found in the muskegs, along with a few scattered spruce among the poplar bush. This timber is suitable for building purposes, but at present has no commercial value. The soil consists on an average of four inches of black loam on a clay or sandy clay subsoil. If the country were cleared of the timber it would be fit for agricultural purposes; it is well watered by several large creeks running southeast and emptying into the Saskatchewan. The water is abundant and of good quality. Wood for fuel can be found on every quarter section. Hay is scarce and found only in small patches along the water-courses. There are no minerals, water-powers, stone in place or coal in this township. The climate is similar to that of Edmonton. Game consists of moose, deer, coyotes, prairie-chickens and partridge.—*M. Kimpe, D.L.S., 1908.*

52. This township is reached by way of Stonyplain and Entwistle. The road was almost impassable last summer so that transportation was exceedingly difficult. The soil is chiefly clay. The surface is thickly timbered with poplar, cottonwood and spruce. Poplar is the only timber of value, there being a large quantity suitable for pulp making. There are no extensive hay areas. Several small streams of fresh water are found. Pembina river runs through this township. Its current is rapid but there are no falls. Summer frosts were experienced every month. There is an abundance of wood for fuel, but no stone quarries or minerals of economic value were observed. Moose, deer, bear and beaver are to be found; the latter have been numerous but are now nearly extinct.—*Geo. Edwards, D.L.S., 1908.*

57. This township is reached from Lake St. Ann settlement, by a wagon road, which passes through it, leading to the mouth of McLeod river. This road, owing to having been but recently opened, is in places rather rough for heavy loads, but as a certain amount is spent every year on grading and improvements, it will soon be a good graded road. The soil in this township consists, in general, of a layer of black loam of variable depth resting on a clay subsoil and may be rated second and third class. The surface of the area contained between the south half of sections 13 and 18 and the north boundary of the township is for the most part undulating. It is in general open prairie with here and there clumps of brush and willow scrub, and the remainder of the township is of a rolling nature and thickly covered over with poplar and spruce from six to eight inches in diameter. In the north half of this township numerous hay meadows, of more or less extent, are to be found, but in some of these the hay is rather coarse and of poor quality. On the other hand, the 'upland' hay crop gathered along the course of Paddle and Little Paddle rivers, owing to its excellent qualities, can always be disposed of at a remunerative price. Paddle and Little Paddle rivers join in this township on the east boundary of section 22. The first-mentioned stream has an average width of twenty-five links, a depth of two feet and a current of one mile per hour; while the latter is fifty links wide, three feet deep with an average current of two miles. Owing to these two streams meandering through this township, a permanent supply of good water is assured to this locality. As above stated, the southern part of this township is densely timbered and a sufficient supply of fuel and lumber can be obtained therefrom. No water-powers, minerals of economic value, nor stone of any description were noted throughout the course of the survey.—*Louis E. Fontaine, D.L.S., 1908.*

61. This township was reached by the old Chalmer or Klondike trail to Holmes Crossing postoffice, and thence by pack trail along the south side of Athabaska river. The soil is generally sandy and when cleared would be suitable for mixed farming.

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## TOWNSHIP WEST OF THE FIFTH MERIDIAN..

*Range 7—Continued.*

The whole township south of the river is heavily timbered with occasional muskegs and swamps, but on the north side the timber is not so heavy. Spruce and jackpine prevail on the south side, with a belt of spruce on the north side extending back half a mile and back of this poplar and cottonwood are found. Nearly all the timber south of the river will average sixteen inches and the belt north of the river eighteen inches in diameter. The poplar runs from four to sixteen inches, averaging about eight inches. There is no hay. Plenty of water is supplied by Athabaska river and the creeks, swamps, &c. Athabaska river averages fifteen chains in width, ten feet deep and has a current of three miles an hour. There is little danger of flooding and no available water-powers. Summer frosts were noticed but little damage was done. Wood is plentiful but no coal, lignite or other economic minerals were noted. There are no stone quarries. Moose, caribou, bear and grouse abound in the district. The greater part of this township south of Athabaska river is suitable for a timber berth.—*C. C. Fairchild, D.L.S., 1908.*

62. This township is reached by the old Chalmer or Klondike trail to Fort Assiniboine and thence a trail to McLeod lake passes through the southern portion of the township. This trail is passable, but in a wet season is very soft and muddy. The surface is timbered but the only timber of any value is along Freeman river in sections 24, 25, 26, 27, 34 and 35, where there is some fine spruce as large as thirty inches in diameter. The remainder of the township is covered with poplar, willow and spruce with some muskeg. The soil is suitable for mixed farming and except where timbered it is generally first class. Freeman river, Goose creek and a couple of lakes and swamps provide ample good water. There is little danger of flooding, and no water-power is available. Freeman river at low water is about two chains wide and averages three feet deep, with a current of three miles an hour. Summer frosts are rather prevalent in the swampy parts. There are no hay lands. No coal, lignite or other economic minerals were found. There are no stone quarries. Jumping deer and moose tracks were seen, also signs of bear were observed.—*C. C. Fairchild, D.L.S., 1908.*

*Range 8.*

40. (North outline.) In this township the surface is chiefly gently rolling land covered with jackpine, spruce and small poplar; the westerly part is dotted with small muskegs. The soil is of fair quality, consisting of sandy clay and some loam.—*B. J. Saunders, D.L.S., 1908.*

52. This township is accessible by the road from Stonyplain to Entwistle. Owing to the heavy traffic over this road last summer in connection with freighting supplies for the Grand Trunk Pacific contractors, the road was nearly impassable. The soil is chiefly clay, and if cleared would doubtless be well suited for general agricultural purposes, but being heavily timbered, it would be quite undesirable for settlement under present conditions. The timber is chiefly poplar with some cottonwood and spruce, with dense growth of underbrush or scrub in most places. The poplar is sound and would no doubt make excellent pulpwood. There are no extensive hay areas. Several creeks, all with one exception, affording good fresh water, are found, but there are no water-powers. Frosts are prevalent in summer. The abundant timber affords fuel but there are no stone quarries nor minerals of economic value. Traces of moose, deer, bear and beaver were seen. The beaver were very numerous here formerly but have all disappeared except in one pond in section 1. The north-west quarter of the township is very swampy.—*Geo. Edwards, D.L.S., 1908.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 8—Continued.*

58. The road from Belvedere to McLeod river passes through this township, also a trail connecting the above to the lake St. Ann and Sturgeon lake trail. Both are very bad in wet seasons. The number of squatters in this township, nearly fifty, proves the good quality of the soil. The eastern half of the township is rolling land covered with small poplar and willow, with some fallen timber. Sections 4, 10, 16, 17 and 8 are covered with green and burnt spruce, poplar and cottonwood of large size. The western portion is more level land, with a dense growth of poplar and spruce muskegs. Timber berth No. 1192 encroaches on this township from the north. Good slough and upland hay can be found throughout this township. Fresh water is supplied by creeks and springs almost anywhere. There are no large streams, water-powers, minerals or stone quarries. The climate is similar to that of Edmonton. No summer frosts were recorded. Partridges, grouse, prairie-chickens and some foxes and coyotes were the only game noticed.—*M. Kimpe, D.L.S., 1907.*

*Range 9.*

40. (North outline.) This township is chiefly gently rolling land covered with jackpine, spruce and poplar up to thirty-six inches in diameter, and the westerly part is dotted with small muskegs and tamarack swamps. The soil is of a very fair quality, consisting of sandy clay and black loam.—*B. J. Saunders, D.L.S., 1903.*

*Ranges 9 and 10.*

44. The Buck lake trail leads from Rimbey and other parts of the settlement to Saskatchewan river, and sleighs may be used on it, but more improvements will be required before wagons could be used the whole distance. A sleigh trail was cut by the writer from the intersection of the twelfth base line with the Buck lake trail and follows the base line. This trail is a very good one for winter use, but should be avoided during the summer. The soil is sandy loam, clay and vegetable mould. Sections 36, 35 and 34, in range 9, are largely composed of muskeg, with jackpine ridges from four to six feet above the general surface. From this point to the crossing of Little Brazeau river, in section 33, township 44, range 10, the soil is somewhat better and the land higher, and when cleared would raise good grass, and might be suitable for cattle or horses. The timber across sections 36, 35 and 34, range 9, is generally quite small and scattered spruce and tamarack in muskegs and small jackpine on the ridges. From the centre of range 9 to Little Brazeau river lies an area of very fine timber consisting of spruce, jackpine, tamarack, with some poplar and cottonwood. The timber runs from six to thirty inches in diameter and lies in sections 33, 32 and 31, range 9. No hay was noticed in these ranges, except a small amount along the Little Brazeau. The water is all fresh, and the supply, as furnished by the Saskatchewan and Little Brazeau, is sufficient and permanent. The Little Brazeau is one and a half to two and a half chains wide, from six inches to two and a half feet deep, with a current apparently very rapid, probably four to five miles per hour. Land along the banks is not liable to be flooded. There are no falls, but rapids are numerous, and higher up the stream could be readily dammed to develop power. The climate is said to be similar to other portions of northern Alberta, and there are occasional summer frosts. Wood is the fuel most readily available, and can be procured almost any place in these ranges from the standing dry timber, which is abundant. No coal or lignite veins were noticed. Neither stone quarries nor minerals of economic value were seen in these townships. Game was apparently very scarce, as very few tracks of either ungulate or carnivora were noticed, but fish are said to abound in Little Brazeau river.—*A. H. Hawkins, D.L.S., 1903.*

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 9.*

52. A road from Stonyplain via Entwistle and thence westward across Pembina river, runs within three miles of the northern boundary of this township. Owing to the heavy traffic the road was almost impassable this season. The soil is clay, covered in most places by moss or vegetable mould. Over one-half of the surface is swamp alternating with jackpine ridges. There is a heavy growth of timber, but very little of any commercial value. There are no extensive hay areas, except a few strips of good grass along a creek. Several creeks afford a supply of good fresh water but there are no water-powers. Frosts are prevalent in summer. There is abundant wood for fuel, but no stone quarries nor minerals of economic value are found. Traces of bear and moose were frequently seen. This township is very undesirable for settlement as there is scarcely any good land.—*Geo. Edwards, D.L.S., 1908.*

55. A pack trail from Lake St. Ann settlement to McLeod river, commonly called 'Jock's' trail, passes about two miles south of this township. From this trail, near the east boundary of section 27, township 54, another pack trail runs north to the north boundary of township 55. It is in good condition. The surface of this township is gently rolling and covered by a thick growth of poplar, spruce and jackpine. The timber is suitable for building purposes, but has no commercial value. The soil is mostly two to three inches of black loam and clay subsoil. On account of the timber this township is not fit for agricultural or ranching purposes. Hay is scarce; water is plentiful and of good quality. No minerals, stone quarries or coal were noticed. There are no large streams and no water-powers. Game consists of moose, bear and grouse. The climate is similar to that of Edmonton. No summer frosts were noticed.—*M. Kimpe, D.L.S., 1908.*

56. A pack trail leaving Jock's trail near the east boundary of section 37, township 54, range 9 and running through the centre of township 55, gives access to this township. Except in a few low spots this trail is in good condition. The soil consists of black loam, to a depth of two to six inches, and clay subsoil. It is suitable for farming. The surface is rolling, covered with old brulé grown up with scrubby willow and poplar with patches of heavy timber. The timber is poplar, spruce and tamarack scattered through the township. Upland hay of good quality is abundant but there are no hay meadows. Water is furnished by Paddle river and several large creeks. It is of good quality and the supply is permanent. Paddle river averages about fifty feet in width with a depth of about three feet at low water. In time of high water there must be from six to ten feet of water, although the land adjoining the river has never been flooded. No water-power is available. The climate is similar to that of Edmonton. Wood fuel is available on every quarter section. No stone quarries, coal or minerals were noticed. Moose, bear and grouse are the only game in the vicinity.—*M. Kimpe, D.L.S., 1908.*

57. A road leaving the lake St. Ann to Sturgeon lake road in township 57, range 8 runs through sections 36, 25, 26 and 24. This road has been open for only a short time and is almost impassable. The surface is rolling and covered with small willow, poplar, spruce and fallen timber. The northern portion is more densely wooded while sections 12 and 13 are covered with large spruce. The soil is mostly sandy clay, the black loam having been burned off by bush fires. It produces, however, a good growth of grass and peavine. Some hay sloughs are located in sections 33 and 34. Several small creeks run through the township emptying into Little Paddle river. Water is good and abundant. There are no water-powers, coal, minerals or stone quarries. Wood, dry and green can be found on every section. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of deer, bear, grouse and coyotes.—*M. Kimpe, D.L.S., 1907.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 9—Continued.*

**57 and 58.** (East outlines.) The country covered by these outlines is rather hilly. The luxuriant growth of grass and peavine together with the sheltered condition of the country will make this a good ranching district. The soil is a clay subsoil with, in places, a good depth of black loam, although on the hills and ridges the top soil has been burned off. Numerous creeks and springs afford a good supply of fresh water. The country is in general covered with poplar and willow brush with patches of fairly good timber. No coal, minerals or water-powers were noticed. Hay is plentiful and of good quality. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**58.** The lake St. Ann to Sturgeon lake road runs through the southern part and the winter trail from Belvedere to McLeod river through the northern part of this township. The surface is rolling except in the northeast corner of the township which is covered with a level muskeg covering about six sections. Outside this muskeg the soil is generally a black loam with clay subsoil well adapted for farming. The land bordering on Little Paddle river is fairly open with patches of poplar and willow. On the south side of the river the timber is larger and some good building timber was seen. Little Paddle river and Bull creek furnish a good supply of fresh water. There is plenty of slough and upland hay of good quality. No water-powers, minerals, stone quarries or coal were found. The climate is similar to that of Edmonton. Game consists of moose, bear, deer, grouse and coyotes.—*M. Kimpe, D.L.S., 1907.*

**59 and 60.** (East outlines.) The country covered by these outlines lies north of Athabaska river and in general is rough and hilly covered with green timber and windfall. The soil is sandy clay, covered with black loam and moss. The country is valuable only for lumbering purposes, the best timber being along Eagle creek and Christmas creek. The proximity of the Athabaska will make lumbering operations easy as soon as an outlet is obtained for the lumber. No water-powers or minerals were found. Sandstone of commercial value and coal have been seen on the Athabaska and on Eagle creek. The climate is similar to that of Edmonton. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

*Range 10.*

**40.** (North outline.) This township consists chiefly of rolling land covered with jackpine, spruce and poplar suitable for building purposes, and is broken by the south branch of Baptiste river and several large tamarack swamps. The soil is of good quality consisting of clay and loam with some sandstone outcroppings.—*B. J. Saunders, D.L.S., 1908.*

**44.** (See report for township 44, range 9, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

**52.** (East outline.) This line is almost all swamp, crossed at intervals by jackpine ridges. There is no timber of any value, and the land is unfit for agricultural purposes.—*Geo. Edwards, D.L.S., 1908.*

**55.** The pack trail known as 'Jock's' trail, runs through the southerly portion of the township, making it easily accessible except during the spring months. The surface of the township is rolling, the soil generally consisting of from two to ten inches of black or vegetable loam, underlain by a subsoil varying from clay to sandy clay, gravel being found in but few places. With the exception of the northern central portions the township is heavily wooded, poplar and pitch-pine being found throughout,



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN..

*Range 10—Continued.*

while in sections 29, 30, 31 and 24, considerable spruce up to twenty-eight inches in diameter, and of excellent quality, is found. Sections 4, 9, 36, 20 and 29 are largely tamarack and spruce swamp. These swamps, acting as reservoirs, furnish a supply of clear, fresh water for a number of small creeks. In a dry season the water supply would, in all probability, fail. Upland grass is found throughout the township but in no place is this abundant. There are no hay sloughs. No minerals, stone in place or water-powers were found. The township generally is suitable for agriculture. Although traces of bear and deer were noticed, duck, grouse and lynx were the only game seen.—*M. Kimpe, D.L.S., 1908.*

56. The township is easily reached by pack animals either from 'Jock's' trail which runs through the southerly portion of township 55, range 10 or from Sturgeon trail on the north. The surface throughout is rolling, the soil generally consisting of from two to ten inches of black loam, underlain by a subsoil varying from clay to sandy clay. Very little gravel occurs and the soil throughout is suitable for agriculture. The township is in general heavily wooded with poplar, and in the lower lands along Paddle river with spruce and tamarack, spruce up to twenty-four inches in diameter being occasionally found. The sections along the base line are covered with willow and poplar scrub. Upland grass, peavine and vetch occur throughout the township, there being excellent grass in sections 28, 29 and 30. The township is drained by Paddle river which with its branches and tributaries gives a permanent supply of clear fresh water. No stone in place, minerals or water-powers were found. The climate resembles that of Edmonton district. Bear, deer, partridge, duck and prairie-chicken were the only game noticed.—*M. Kimpe, D.L.S., 1908.*

57. We reached this township by travelling from Edmonton to Lake St. Ann settlement and thence following a road leading in a northwesterly direction to Greencourt postoffice, situated on section 16, township 8, range 9. The distance from Lake St. Ann to Greencourt is considered to be about fifty-five miles and for forty miles the road is only a trail in a deplorable condition through a difficult country. The mail travels from Edmonton to Greencourt by way of Riviere-qui-barre and McDonald's crossing at the Pembina. Then from there it goes westerly through Peavine prairie until it reaches Greencourt which is said to be sixty miles from McDonald's crossing. The soil in this township is a thin coat of black loam over a clay subsoil. Stones, gravel and sand are frequently met with. In spite of this, it appears to be quite suitable for farming purposes. The surface is heavy rolling and hilly. In the northwest and southwest sections it is nearly mountainous. The slope is mostly to the south. Poplar from five to nine inches in diameter in fair quantities is met with in the northern part of the township. Spruce is found in small muskegs in most of the sections. The largest areas of spruce are in the swamps on the north boundary of section 9 and on the east boundaries of sections 3 and 10. There may be enough wood to supply the first wants of the settlers and furnish fuel for two or three years, but there is no merchantable timber of any extent in the township. Outside of the areas of fairly large spruce and poplar already spoken of the country is covered with a growth of small poplar and brush with, in places, small patches of scrubby prairie. In most of the sections there is enough easily cleared ground to make a good farm in a few years. Hay sloughs are small but prairie is found in every section. With the exception of the lake on the north boundary of section 24 the only supply of water comes from the numerous rivulets which cross the township. The water is good everywhere. There are no water-powers, stone quarries nor minerals in the country. The climate is about the same as that of Edmonton. Game is scarce; we saw only a few partridge, a few rabbits and geese in the lake in section 24.—*Geo. P. Roy, D.L.S., 1908.*



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 10—Continued.*

**57 and 58.** (East outlines.) The country covered by these outlines is rather hilly. The luxuriant growth of grass and peavine together with the sheltered condition of the country will make this a good ranching district. Some good farming land can be found in this range where the surface is more gently rolling. The soil is a clay subsoil with, in places, a good depth of black loam although on the hills and ridges the top soil has been burned off. Numerous creeks and springs afford a good supply of fresh water. The country is in general covered with poplar and willow brush with patches of fairly good timber. No coal, minerals or water-powers were noticed. Hay is plentiful and of good quality. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**58.** The lake St. Ann and Sturgeon lake road touches this township near its northeast corner. A trail was cut from the above trail in section 3, township 59, south to the south boundary of this township, but, being a winter trail, it would be impassable in the summer. The surface is hilly and covered with poplar and willow. Spruce occurs along the creeks, which are numerous, running into Little Paddle river and Bull creek. The soil is mostly sandy clay the black loam having been burned off. There are several small hay sloughs and in places upland hay could be cut. The country would be better adapted to ranching than farming. No water-powers, minerals, coal or stone quarries were noticed. The climate is similar to that of Edmonton. No summer frosts were reported. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**59.** The lake St. Ann and Sturgeon lake road cuts this township from section 1 to section 19. It is a fairly good trail better adapted to pack horses than wagons on account of the hilly nature of the country. A muskeg encroaches on this township from the east, rendering sections 24, 13, 12, 14 and 23 useless at present. The rest of the township is covered with timber more dense along Athabaska river where large spruce trees were noticed. Toward the southern part of it, the timber gets lighter with more windfall. The soil is a sandy clay covered with black loam where the bush fires have not burned it off. Some sections along the trail would be adapted for agricultural purposes. Several springs furnish a good supply of fresh water. Hay is not plentiful the best being in sections 1 and 2 already taken by squatters. No water-powers, minerals, coal or stone quarries were noticed. The climate is similar to that of Edmonton. No summer frosts were reported. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**59 and 60.** (East outlines.) The country covered by these outlines lies north of Athabaska river, and in general is rough and hilly, covered with green timber and windfall. The soil is sandy clay, covered with black loam and moss. This country is valuable only for lumbering purposes, the best timber being along Eagle creek and Christmas creek. The proximity of the Athabaska will make lumbering operations easy as soon as an outlet is obtained for the lumber. No water-powers or minerals were found. Sandstone of commercial value and coal have been seen on the Athabaska and on Eagle creek. The climate is similar to that of Edmonton. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

*Range 11.*

**40.** (North outline.) This township consists chiefly of heavy rolling land, covered with fallen timber, and is well wooded with jackpine, spruce and poplar suitable for  
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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 11—Continued.*

building purposes. There are also outcroppings of coal in section 6, township 41. The soil is of a fairly good quality, consisting of loam with clay subsoil.—*B. J. Saunders, D.L.S., 1908.*

*Ranges 11 and 12.*

44. The best route for reaching these townships is probably to follow the Buck lake trail to where it is crossed by the twelfth base line and thence by following the trail cut in running the line. This trail is quite easy to follow in winter with sleighs, but should be avoided in summer and one of the pack trails leading from Rocky Mountain House used. The soil is a sandy loam and gravel on the ridges and black loam with a clay subsoil in the muskegs, and would have to be cleared to be cultivated. Some places along the Brazeau and Little Brazeau would doubtless, if cleared, produce good hay, coarse grains, potatoes and vegetables. The surface is rolling and all timbered with small trees four to twelve inches in diameter, of little value for lumbering, but sufficient for buildings for settlers and for fuel. A small amount of hay might be cut along the Little Brazeau and where the line cuts it. The water is all fresh and the supply abundant and permanent. The Little Brazeau is one and one-half to two and one-half chains wide, six inches to two and one-half feet deep, with a current apparently very rapid, probably four to five miles per hour. Land along the banks is not flooded; there are no falls or rapids, but the stream could be dammed and power developed higher up. Brazeau river, three to twenty chains wide, six inches to six feet deep, has a current of three to five miles per hour, and in places divided into numerous channels. The valley had numerous bars, which are flooded at high water from two to five feet deep. The climate is probably similar to the settled portions of northern Alberta, but is subjected to occasional summer frosts. Wood is the most easily available fuel, of which there is an abundance to be procured at any place in these townships. Some drift coal was noticed on Brazeau river, but no veins in place were seen. No stone quarries and no minerals of economic value were noticed. Game is not plentiful, a few fresh elk tracks were seen, and occasionally a fox or wolf track; signs of bear were numerous, and a few grouse were seen. There is said to be an abundance of trout in both rivers.—*A. H. Hawkins, D.L.S., 1907.*

*Range 11.*

54. The northern part of this township is quite inaccessible by pack animals during the summer months. A winter trail crosses section 36. The country is gently rolling, consisting of spruce and tamarack swamps, the few ridges which occur being covered with windfall. This portion of the township is quite unsuitable for agriculture. Poison creek, a stream twenty-five feet wide and five feet deep, runs through section 36, emptying into Chip lake. Muskrats, mink, geese and duck were noticed around Chip lake. The climate is similar to that of Edmonton. No water-power, coal, stone or minerals were noticed.—*M. Kimpe, D.L.S., 1908.*

55. The pack trail from lake St. Ann settlement to McLeod river, known as 'Jock's' trail, runs in a westerly direction through the centre of the township. A winter trail enters the township in section 1 and leaves it in section 19. The township is thus easily accessible, except during the spring months. The northern half of the township is sharply divided from the southern by a ridge which runs westerly through the centre of the township. The northern portion is heavily rolling and covered with poplar generally, the ridges being covered with willow and poplar scrub, while spruce and tamarack are found in the lower valleys. The soil in this portion consists of from

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

## Range 11—Continued.

two to four inches vegetable loam underlain by clay or sandy clay, stones and boulders being found on all the ridges. The southern portion consists of tamarack and spruce swamps, with an occasional ridge of poplar and jackpine. In sections 4, 5, 6 and 7 considerable spruce, up to thirty inches diameter and of an excellent quality, is found. Fuel is, of course, abundant. The township is not well adapted to agriculture. The creeks and small lakes which are found in the southern portion of the township drain into Poison creek, a stream twenty-five feet wide and about six feet deep where it leaves the township in section 1. Water is excellent and abundant. Grass grows throughout the township, but no hay sloughs were found. No minerals, stone in place, coal or water-powers were found. Duck, partridge, chicken, muskrats and jackfish were the only game noticed, these latter being found in the small lake in sections 8 and 9.—*M. Kimpe, D.L.S., 1908.*

56. The township is most easily reached from the pack trail known as 'Jock's' trail from Lake St. Ann settlement to McLeod river, which runs through the centre of the township to the south. With the exception of the spring months, this trail is in good condition through the year, there being a winter road for sleighs. The surface of the township is heavily rolling, the soil consisting of sandy clay, with gravel and stones on all the uplands. The western half of the township is covered with poplar and willow scrub, while the eastern portion is heavily wooded with poplar, birch, jackpine and spruce, tamarack being found in the lower lying lands. Small hay sloughs occur in sections 29 and 27, but upland grass is fairly abundant throughout the western portion of the township. Clear, fresh water is furnished by a number of small creeks, but this supply in a dry season would in all probability fail. These creeks eventually drain into Paddle river. The climate resembles that of the Edmonton district, but frosts occur very early. Fuel is abundant. No minerals, stone in place or coal were found. Grouse are plentiful, and one moose was seen, these being the only game noticed.—*M. Kimpe, D.L.S., 1908.*

57. To reach this township we came through St. Albert and Lake St. Ann settlement to Greencourt by a road running northwest for nearly sixty miles, forty of which is only a wood trail, muddy, hilly and crooked, ascending steep inclines, sliding down vales, winding through woods and wading muskegs, rivers and creeks. The heaviest grades are at the approaches of the Pembina and at a small creek about ten miles east of Greencourt. Another road, which the mail follows, runs by way of Prince Albert, Rivière-qui-barre and McDonald's crossing at the Pembina and from there westerly by Raydale to Greencourt. This trail is reputed to be more difficult to travel and longer than the other. The topography of the country may be given as a succession of hills with easy slopes, except in the north part of the township, where the hills are steep and difficult of access. The soil underlain by clay, sandy clay or clay and gravel, is a layer of black loam, four to eight inches deep in the more open places. In the bush it is a top dressing of vegetable mould and black loam in the sloughs, and a growth of moss in the spruce swamps. It is certainly well adapted for farming, and quite suitable for the growing of vegetables and roots of the hardier kind. The surface is rough and broken, especially in the northern part. It is covered with small poplar and willow brush, patches of bare prairie alternating with bluffs of larger poplar and some spruce muskegs. There is no merchantable timber to any extent. A good fire would denude the country completely. The spruce muskegs should be preserved for the preservation of the water supply, as they appear to be the headwaters of quite a number of creeks some of which flow to Paddle river and others to McLeod river. Hay sloughs are scarce, but there is, all through the township, a growth of peavine which would

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 11—Continued.*

supply quite a quantity of upland hay. The water is good wherever found. There being no large streams there are no available water-powers. The climate is moderate, as far as I could judge. I am told that there were light summer frosts, but not severe enough to harm the crops. Wood is the only fuel readily available, and nearly every section contains enough for a few years. We noticed outcroppings of stone and boulders in some places, but there are no stone quarries, nor any minerals of economic value of any kind. We saw tracks of moose, deer and bear. Partridge and chicken and a few rabbits were the only game seen.—*Geo. P. Roy, D.L.S., 1908.*

**57 and 58.** (East outlines.) The country covered by these outlines is rather hilly. The luxuriant growth of grass and peavine, together with the sheltered condition of the country, will make this a good ranching district. Some good farming land can be found in this range, where the surface is more gently rolling. The soil is a clay subsoil with, in places, a good depth of black loam, although on the hills and ridges the top soil has been burned off. Numerous creeks and springs afford a good supply of fresh water. The country is in general covered with poplar and willow brush, with patches of fairly good timber. No coal, minerals or water-powers were noticed. Hay is plentiful and of good quality. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**59.** The lake St. Ann and Sturgeon lake pack trail crosses the northern portion of this township and is fairly good. The surface is rough and hilly, covered with heavy timber on the north half and fallen timber and scrub on the south half. Several large creeks run through this township, the most important being Beaver and Mink creeks. The 'flats' along the Athabaska might be fit for agricultural purposes, although covered in places by fallen timber. Hay is scarce and of poor quality, being found only in muskegs. Good sized spruce were seen along the Athabaska, but not in sufficient quantity to be of any commercial value. No water-powers, minerals, stone quarries or coal were noticed. The climate is similar to that of Edmonton. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

**59 and 60.** (East outlines.) The country covered by these outlines lies north of Athabaska river, and in general is rough and hilly, covered with green timber and windfall. The soil is sandy clay, covered with black loam and moss. This country is valuable only for lumbering purposes, the best timber being along Eagle creek and Christmas creek. The proximity of the Athabaska will make lumbering operations easy as soon as an outlet is obtained for the lumber. No water-powers or minerals were found. Sandstone of commercial value and coal have been seen on the Athabaska and on Eagle creek. The climate is similar to that of Edmonton. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

*Range 12.*

**44.** (See report for township 44, range 11, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1907.*

**40.** (North outline.) This township consists chiefly of rolling burnt land, covered with jackpine, spruce and poplar suitable for building purposes, and there is a great deal of fallen timber. The soil is of fair quality, consisting chiefly of loam, with clay subsoil, and clay and coarse gravel.—*B. J. Saunders, D.L.S., 1908.*

**54.** This township can be reached during the winter from the Grand Trunk Pacific railway, the line being four miles south. Windfall and swamps would make it very difficult for heavy loads during the summer. The country generally is low and wet,

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 12—Continued.*

the few small ridges being covered with excessively bad windfall. Spruce and tamarack, with occasional jackpine ridges, are found throughout, but have little commercial value. The soil is quite unsuitable for agriculture, and practically no grass or hay is found. Although there are no creeks, the country is drained by Little Lobstock river, a stream averaging one chain wide and five feet deep. Along this creek traces of mink and marten are plentiful, but partridge and muskrats were the only game seen.—*R. V. Heathcott, D.L.S., 1908.*

**55.** The trail known as 'Jock's trail' runs in a westerly direction through the northerly portion of the township. Except during the spring months, when the trail becomes rather wet, the township is easily reached from Lake St. Ann settlement or Entwistle, a station on the Grand Trunk Pacific railway, by means of pack animals, while during the winter sleighs can be used, the trail being cut wide enough for that purpose. The surface of the township is gently rolling and is heavily wooded, the northern third having poplar and spruce, while the southern portion is heavily covered with spruce, tamarack and jackpine. With the exception of clumps of heavy spruce along the southern boundary, none of the timber is of much value. In sections 1, 4 and 5, however, considerable spruce of a good quality is to be found. The soil on the uplands consists of from two to six inches of black loam underlain by sand or sandy clay, with boulders in many places. In the lower lying portion the usual growth of moss underlain by black muck is found. The township is quite unsuitable for agriculture at present. Several small lakes are found in the southern portion of the township giving a permanent supply of clear, fresh water, which drains by way of Poison creek into Chip lake; the northwest corner of the township, however, drains into McLeod river. Upland grass is luxuriant, and a small quantity of hay could be cut around the lake lying along the north boundary of section 9. Fuel is abundant. No minerals, water-powers or stone in place were found. The climate resembles that of the McLeod river district, being slightly more extreme than that of Edmonton. No game except chicken, partridge and muskrats was seen.—*R. V. Heathcott, 1908.*

**56.** This township is easily reached from the trail known as 'Jock's trail,' which runs in a westerly direction through the northern portion; it is cut wide enough for sleighs, and as a pack trail is in good condition, except during early spring. The surface is heavily rolling, the soil consisting of sandy clay or clay, with from two to eight inches of vegetable loam on the surface. The eastern two-thirds of the township is in general covered with willow and poplar scrub, spruce and tamarack being found in the lower depressions. In the western portion considerable spruce, poplar and birch of good size and fair quality is found, the under brush being very heavy. Jackpine ridges occur along the western limit, but the timber is of very little or no value. The western portion of the township is unsuitable for agricultural purposes, but the eastern portion is very good and quite suitable. No hay sloughs of any size were found, though upland grass is abundant. There is plenty of water of excellent quality, several small creeks furnishing a permanent supply. There are no water-powers. No minerals, coal or stone quarries were found. Grouse and deer are the only game. The climate is the same as that of Edmonton.—*R. V. Heathcott, D.L.S., 1908.*

**57 and 58.** (East outlines.) The country covered by these outlines is rather hilly, especially where the lines pass over House mountain, the summit of which is about five hundred feet above McLeod river. The luxuriant growth of grass and peavine, together with the sheltered condition of the country, will make this a good ranching district. The soil is a clay subsoil with, in places, a good depth of black loam,

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 12—Continued.*

although on the hills and ridges the top soil has been burned off. Numerous creeks and springs afford a good supply of fresh water. The country is in general covered with poplar and willow brush, with patches of fairly good timber, this range being heavily wooded with poplar and spruce of good merchantable value. No coal, minerals or water-powers were noticed. Hay is plentiful and of good quality. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

59. The lake St. Ann and Sturgeon lake pack trail enters this township in section 36; another pack trail from the west connects with the above on this section. The surface of this township is hilly and broken by ravines. Some of the flats along McLeod river are level and fit for agricultural purposes. The northern slope of House mountain, a high ridge situated mostly south of this township, is covered with fallen timber and a dense growth of small poplar and jackpine. There is, along the Athabaska and McLeod rivers, a small fringe of spruce fit for lumbering or building purposes. The soil of the northern portion of this township is a sandy clay covered by black loam to a depth of two to four inches, while the soil of the southern portion of the township is only sand and gravel. Good hay can be found along the McLeod. This river averages about seven chains in width, with from four to fifteen feet of water and a current of five miles an hour at low water. The Athabaska is a much larger river and very swift. There are no water-power sites on the Athabaska or McLeod. A seam of coal outcrops on the north bank of the McLeod and the south bank of the Athabaska, and would indicate a bed of coal in sections 21, 28, 29, 32 and 33. No minerals or stone quarries were noticed. Water is fresh and abundant. There is a good supply of wood for fuel and building purposes. Game consists of moose, deer, bear, timber wolves and grouse. The climate is similar to that of Edmonton. No summer frosts were recorded.—*M. Kimpe, D.L.S., 1907.*

59 and 60. (East outlines.) The country covered by these outlines lies north of Athabaska river, and in general is rough and hilly, covered with green timber and windfall. The soil is sandy clay, covered with black loam and moss. This country is valuable only for lumbering purposes, the best timber being along Eagle creek and Christmas creek. The proximity of the Athabaska will make lumbering operations easy as soon as an outlet is obtained for the lumber. No water-powers or minerals were found. Sandstone of commercial value and coal have been seen on the Athabaska and on Eagle creek. The climate is similar to that of Edmonton. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

*Range 13.*

44. These townships are similar in character, and may therefore be classified with fallen timber and thick scrub, with scattered clumps of jackpine, spruce and balsam. The soil is of fair quality, consisting of loam with clay subsoil, and clay with sandstone outcroppings.—*B. J. Saunders, D.L.S., 1908.*

*Ranges 13, 14, 15, 16.*

44. These townships are all similar in character, and may therefore be classified together. They may be reached by following the trail leading from the Mountain House on Saskatchewan river to Brazeau river during summer, or in winter by following the sleigh trail cut when running the twelfth base line. The sleigh trail follows the river from the first crossing of the line in range 13. The soil on the uplands is



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Ranges 13, 14, 15, 16—Continued.*

sandy loam and gravel and in the muskegs vegetable mould, while in the river bottom large flats of silt or river sand were noticed. The soil on the uplands is apparently not very fertile, as very little grass was noticed. It is apparently too sandy, although in the valleys the growth appeared to be quite luxuriant. The surface is rolling, the larger proportion of these townships being muskegs, forming the head waters of many deep ravines and small creeks leading to the river, but the land seems to be poor and the timber small and scattered, except in the valley of the Brazeau, where there are some fine bunches of spruce. Hay in small quantities was noticed in several places along the valley, but not of much value on account of the windfall and flooding. The water is all fresh and abundant. Brazeau river, three to twenty chains wide and six inches to six feet deep, has a current of three to five miles per hour, and in places divides into numerous channels; the valley between the banks has numerous bars and is all liable to flooding from two to six feet. This fact is rather a deterrent to settlement upon any of the meadows, which are in many cases covered with windfall. The river, I think, would be difficult to drive on account of bars and swift current, as great jams of driftwood are to be seen along its banks, and the high water mark is clearly indicated on the standing timber. No water-powers were noticed in these townships. The climate is evidently similar to that of the other portions of northern Alberta lying contiguous to the mountains, and would be, I think, subject to occasional summer frosts. Wood is the most readily available fuel and is abundant on all sides. No stone quarries or minerals of economic value were noticed, although drift coal was seen along Brazeau river. A few tracks of deer and elk were observed, but game was apparently scarce, although trout, of which there are said to be several varieties, are plentiful in the Brazeau and its tributaries. I should like to draw attention to the tract of country comprising sections 32 and 31, township 44, range 16, and sections 4, 5 and 6, township 45, range 16, crossed by this line. These sections would, in the writer's opinion, form a very desirable holding for either horses or cattle. Some clearing would be required to get rid of the windfall, but with small improvement a very considerable tract of land could be easily reclaimed, and hay could be cut without clearing in several places in section 4 that are quite above the high water mark, while there is ample timber for building and fences, as well as fuel.—*A. H. Hawkins, D.L.S., 1908.*

*Range 13.*

54. This township is easily reached from the Grand Trunk Pacific railway, which runs through the southerly portion of the township. The surface is gently rolling, the eastern half consisting of level, wet tamarack and spruce swamps, with occasional ridges bearing small jackpine, while the western half is covered with small spruce, tamarack, jackpine and poplar, the windfall being excessively bad. None of the timber is of any value. The soil on the ridges consists of sand or a very light sandy clay, and is quite unsuitable for agriculture. There is practically no grass, and no hay sloughs were found. Several small creeks drain this township, the eastern half draining into Lobstick river, while the western half drains into McLeod river. No minerals, stone in place or water-powers were found, and game, with the exception of grouse, is very scarce.—*R. V. Heathcott, D.L.S., 1908.*

55. The trail known as Jock's trail runs through the northerly portion of this township. Except in the spring, this trail is in good condition for pack horses in summer and sleighs in winter. The trail runs either to Lake St. Ann settlement or Entwistle. The surface is gently rolling, and, with the exception of some clumps of fair spruce along McLeod river, is covered with small spruce, tamarack, jackpine and



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 13—Continued.*

poplar, most of which is firekilled. The soil of the uplands consists of clay, sandy clay or sand with boulders in places, and on the whole is hardly suitable for agricultural purposes. Although good soil is found on some of the flats, the southeastern portion of the township is wet, consisting of spruce and tamarack swamps, the small jackpine ridges being covered with windfall. While upland grass is abundant in the northern portion and on nearly all the flats along the river, very little hay could be cut. No minerals or coal were seen, although there are several outcrops of gray sandstone along the river. Excellent water is found all over the township. There are no water-powers. The climate is a little more severe than that of Edmonton. A few moose, grouse and rabbits were the only game seen.—*R. V. Heathcott, D.L.S., 1908.*

56. The Shiningbank lake trails are suitable for either pack horses in summer or sleighs in winter. The pack trail is in good condition, except in the early spring, the township is thus easily accessible during the summer, fall and winter from either lake St. Ann or Entwistle. The surface is rolling. The soil to the east of McLeod river, which flows through this township in a northerly direction, is chiefly sand, while west of the river it is sandy clay or clay, with a few inches of black loam on the surface. There are a few clumps of good spruce along the west side of the river, but the land lying east is covered with jackpine, spruce, tamarack and poplar of poor quality. The soil is hardly suitable for agriculture, except on the flats along the west bank of the McLeod. A few small hay sloughs occur in the eastern portion of the township, while in the western portion upland grass is abundant. Water of excellent quality is found everywhere. The creeks drain into McLeod river. Gold washing has been carried on in the river at different times. No coal was seen, but several sandstone exposures occur along the McLeod. There are no water-powers. The climate is practically the same as that of Edmonton. No game was seen, but there are plenty of fish in the river.—*R. V. Heathcott, D.L.S., 1908.*

57 and 58. (East outlines.) The country covered by these outlines is rather hilly, especially where the lines pass over House mountain, the summit of which is about five hundred feet above McLeod river. The luxuriant growth of grass and peavine, together with the sheltered condition of the country, will make this a good ranching district. The soil is a clay subsoil with, in places, a good depth of black loam, although on the hills and ridges the top soil has been burned off. Numerous creeks and springs afford a good supply of fresh water. The country is in general covered with poplar and willow brush, with patches of fairly good timber, this range being heavily wooded with poplar and spruce of good merchantable value. No coal, minerals or water-powers were noticed. Hay is plentiful and of good quality. The climate is similar to that of Edmonton. No summer frosts were recorded. Game consists of moose, deer, bear, wolves and grouse.—*M. Kimpe, D.L.S., 1907.*

*Range 14.*

40. (North outlines.) This township consists chiefly of burnt rolling land covered with considerable fallen timber and scattered clumps of jackpine, spruce and poplar suitable for building purposes, and is much broken by Mire creek and an outlying spur of the Rocky mountains in the westerly sections. There are some outcroppings of limestone. The soil is of very fair quality, consisting of loam and clay.—*B. J. Saunders, D.L.S., 1908.*

44. (See report for township 44, range 13, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 14—Continued.*

53. This township is reached by the Yellowhead pack trail, which runs through the southern part of it. The trail was in very poor condition. The soil is mostly black loam with clay subsoil. When cleared the country will be suitable for farming. The surface is covered with poplar and willow, but no timber nor hay is to be found. There is a small creek flowing through sections 30, 29, 28, 27, 26 and 25, but there is no water-power in the township. There were no frosts at the time of survey (July). There is plenty of dry poplar in this township, but no stone quarries nor minerals were found and no game was seen.—*J. C. Baker, D.L.S., 1908.*

55. I reached this township by Jock's trail, which runs near the south cross line, and is in good condition. The soil is black loam and clay subsoil, suitable for farming. The surface is covered with small poplar and willow, and in section 12, along McLeod river, there are some large spruce and tamarack, varying in size from six to twenty-four inches in diameter. There is plenty of hay land in sections 4, 9, 10, 11, 3 and 2. It is good quality, both lowland and upland. In May the weather was very wet and in September fine and clear. McLeod river, a fine fresh water stream, flows through the southern part of this township. There is no water-power. Plenty of dry poplar for fuel is to be found anywhere. No stone quarries, minerals or game were seen.—*J. C. Baker, D.L.S., 1908.*

56. I reached this township by a pack trail which follows the eastern boundary of townships 55 and 56, range 14. This trail was new, but was fairly good. The soil, which is black loam with clay subsoil, is suitable for farming. The surface is covered with small poplar and willow, too small for timber purposes. There is plenty of upland hay of good quality found principally in sections 32, 33, 34, 27, 26, 25, 22, 23, 14 and 24. There is an abundance of fresh water in this township. Shiningbank lake is a large body of fresh water comprising sections 27, 28, 29 and 30. Shiningbank creek flows easterly from the lake and empties into McLeod river. There are no water-powers. The weather was warm at the time of survey. Dry poplar for fuel can be found anywhere in the township. There are no stone quarries nor minerals. Some moose and bear were seen, and plenty of geese and duck on Shiningbank lake.—*J. C. Baker, D.L.S., 1908.*

*Range 15.*

40. (North outline.) The easterly part of this range is badly broken by an outlying spur of the Rocky mountains, which is about 2,000 feet high on each side of the gap through which the line passes. The slopes are covered with jackpine and small poplar. The westerly part of the township is more rolling and open. The soil is of fair quality, consisting of loam and clay, with limestone outcropping.—*B. J. Saunders, D.L.S., 1908.*

44. (See report for township 44, range 13, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

52. This township is reached by the Yellowhead Pack trail which runs through the southern part of it. The trail was in very poor condition. The soil is nearly all black loam with clay subsoil. When cleared it will be suitable for farming. The surface is covered with poplar, willow and jackpine, but the wood is too small for timber purposes. There is no hay. In section 29 there is a fine fresh water lake and a smaller one in section 20. Wolf creek flows northerly through the western part. It is a fresh water stream varying in depth from two to six feet, but there is no water-power in the township. At the time of survey (August) there were no frosts. There

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 15—Continued.*

is plenty of dry poplar and tamarack, but no stone quarries nor minerals were found. No game was seen.—*J. C. Baker, D.L.S., 1908.*

53. This township is reached by the Yellowhead pack trail which runs through the southern part of it. The trail was in very poor condition. In this township the soil is nearly all black loam with clay subsoil. When cleared it will be suitable for farming. The surface is covered with poplar, willow and jackpine, but it is too small for timber purposes. There is no hay. In section 9 there is a fine fresh water lake and a smaller one in section 16. The creeks are all very small in this township. The weather was warm at the time of survey (July). There is plenty of dry poplar and tamarack for fuel. No water-powers, stone quarries nor minerals were found, and no game was seen.—*J. C. Baker, D.L.S., 1908.*

55. I reached this township by 'Jock's' trail, which passes through the southern part of the township. The trail was in fine condition. The soil is mostly sandy loam and suitable for farm purposes when cleared of its small poplar and willow. No timber of value nor any hay land was found. There are several fresh water lakes, but no water-powers. The climate is like that of northern Alberta generally, with frosts in September. There is plenty of dry poplar and tamarack for fuel. No stone quarries, mineral nor game were seen.—*J. C. Baker, D.L.S., 1908.*

*Range 16.*

40. (North outline.) In this township the land consists chiefly of hilly land covered with jackpine, spruce and balsam, six to twenty-four inches in diameter, and fallen timber. The soil is of fairly good quality, consisting of loam with clay subsoil.—*B. J. Saunders, D.L.S., 1908.*

44. (See report for township 44, range 13, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

52. This township is reached by the Jasper or Yellowhead pack trail which passes through the northern part of the township, but it was in very poor condition. The soil, which is black loam with clay subsoil, will be suitable for farming when cleared of poplar, willow, spruce and tamarack, with which the surface is now covered. This is all too small for timber purposes. There are no hay meadows. Moose creek, a fine fresh water stream about two chains wide and varying in depth from one to six feet, flows northerly through the western part, but there is no water-power in the township. The weather was very warm at the time of the survey (August). There is plenty of dry spruce and tamarack for fuel, but no stone quarries nor minerals were found, and no game was seen during the survey.—*J. C. Baker, D.L.S., 1908.*

*Range 17.*

40. (North outline.) In this township there is very hilly country well timbered with jackpine, spruce and balsam, and covered with fallen timber. The westerly part of the township is broken by the Bighorn range of the Rocky mountains, and is barren and practically impassable. These mountains show an elevation of 8,225 feet above sea-level, which is approximately 2,000 feet above the water of the branch of Brazeau river. This stream breaks through the mountains in section 31, township 40. The soil consists of loam with subsoil of clay and stone, and limestone outcroppings.—*B. J. Saunders, D.L.S., 1908.*

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Ranges 17, 18, 19.*

44. These townships lie in the foothills, and being similar in all respects are classified together, and until easier and more speedy means of transport and better roads are established are not likely to be occupied. At present their only visitors are surveyors, prospectors or Indians. They may be reached by following the trail leading from the Mountain House, on Saskatchewan river, to the Brazeau river during summer, or in winter by following the sleigh trail cut when running the twelfth base line. The soil is sandy loam and gravel on the hills and ridges, and black loam in the valleys, and, if cleared of the windfall and brush, would doubtless raise a good crop of grass and possibly oats, but I think the elevation is rather too great for farming to any extent; cattle and horses would, however, do well in this locality. The surface is very rolling and broken, cut by numerous deep ravines leading to Brazeau river and several high rocky peaks. The timber is without commercial value, except in range 19, where a nice bunch was noticed extending for about two miles along the river and one-half to one mile on either side, and is chiefly spruce, six to twenty-four inches in diameter. In other localities there is generally sufficient for fuel or buildings required by settlers, but the whole surface of this country has been repeatedly burnt over. Hay meadows were noticed in some of the small valleys, but the windfall, dry timber and brush would have to be cleared before the hay could be cut. The water is all fresh and abundant and the supply is permanent. Brazeau river, flowing through a canyon throughout these ranges, is from one to six feet deep, two to four chains wide, with a current of three to four and a half miles per hour, and lands in the valley below the canyon are liable to flooding two to four feet deep. There are no falls, but many rapids and several good locations for damming were noticed, and especially about sections 33 and 34, range 19, where the canyon walls are rocky and precipitous. The climate is apparently similar to other places in northern Alberta, but is subject to summer frosts. Wood is the fuel most readily available, but drift coal was seen along the river, although no seams were observed. There are said to be several coal locations in this vicinity. No stone quarries or minerals of economic value were observed. Tracks of moose, elk and red deer were seen on several occasions. Many signs of bear were noticed, and trout, of which there were said to be several varieties, were apparently abundant in the river.—*A. H. Hawkins, D.L.S., 1908.*

*Range 17.*

52. This township was reached by the Jasper or Yellowhead pack trail, which was in very poor condition. The soil in the southern part is black loam and clay sub-soil, suitable for farming. In the northern part, especially near McLeod river, it is sand, and may be only good for grazing. The surface is covered with small poplar, willow, spruce and tamarack. There is some spruce and tamarack large enough for timber in sections 3, 4, 5 and 6. It varies from eight to twenty-four inches in diameter. There are no hay meadows. McLeod river passes through the northern part of this township. The weather was very warm at the time of survey (August). There is plenty of dry tamarack and spruce for fuel but no stone quarries nor minerals are found, and no game was seen.—*J. C. Baker, D.L.S., 1908.*

*Range 18*

40. (North outline.) The easterly part of this township is very mountainous and practically impassable. The westerly part is more rolling and well timbered with open stretches along the branch of Brazeau river, and gradually opens out into a broad plain leading to the northwest. The soil consists chiefly of clay, stone and coarse gravel, with some loam.—*B. J. Saunders, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 18—Continued.*

44. (See report for township 44, range 17, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

*Ranges 18 and 19.*

48. Access to these townships is obtained by following the trail on the south bank of McLeod river from 'Big eddy' and follows the east bank of Embarras river. The surface is somewhat rolling, muskeg and sandy jackpine ridges; along the Embarras valley, which cuts the township in range 18, section 32, are some small meadows, to the north along the Embarras river are some very fine meadows bounded by a large amount of brulé and windfall timber, chiefly small spruce, jackpine, a few poplar, willow and tamarack. The soil is very sandy on ridges, with vegetable mould in the muskeg, and the clay and stone subsoil apparently not very fertile; grass is not luxuriant at any place along the line, except a few small patches on the rivers, but the soil would probably support a good vigorous growth of timber if cared for. The timber is poor, a small quantity along the river banks being composed of spruce and jackpine in sections 32 and 31, township 48, range 18. No hay of any account was found along the line, but a very fine meadow was noticed in township 51, range 19, at the junction of the east and west forks of Embarras river. Hay of good quality, composed of peavine and redbud, extends about two and a half miles along the river and from one-quarter to one-half mile in width, and much more could be taken in with small improvements. The water is all fresh and the supply abundant. Each branch of the Embarras is from one to one and a half chains wide, six inches to three feet deep, with a current of two to three and a half miles per hour; the land generally is not liable to flooding from the river. No water-powers are found in these townships. The country is said to be subject to summer frosts. The fuel most readily available is wood, an abundance of which may be had in any direction. No veins of coal or lignite were observed, nor stone quarries, nor minerals of economic value. Traces of moose, elk, bear, foxes and wolves were seen, but game appears to be rather scarce in this locality.—*A. H. Hawkins, D.L.S., 1907.*

*Range 18.*

52. There are no regularly used trails into this township; it can be reached from the trail to the Yellowhead pass, but, owing to the quantity of muskeg, it is hard to get into with horses in the summer time. The soil is chiefly sandy loam, with peat, clay and gravel subsoil, and, with the exception of sections 36, 33 and 21, where the soil is a good black loam with clay subsoil, is not suitable for agricultural purposes. The surface is rolling and covered with spruce, tamarack and jackpine up to eighteen inches in diameter. There is also poplar in places. The timber is suitable for lumbering. McLeod river runs right through the township. There are also a number of small creeks containing good water. There is good hay land on sections 36 and 33. The climate is the same as at Edmonton. There are no minerals, stone quarries or water-powers. Bear, moose, deer and partridge were seen. Fish are plentiful in McLeod river and the creeks.—*R. V. Heathcott, D.L.S., 1907.*

53. This township may be reached from Edmonton in the winter by a sleigh road which passes through Lake St. Ann settlement and runs across Isle and Chip lakes, and thence to McLeod river. In summer wagons may be taken as far as Chip lake, but from there pack horses must be used. The pack trail to Yellowhead pass runs across this township. The soil in the southern portion of the township is a good black loam with clay subsoil, and is very suitable for mixed farming. The surface is

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 18—Continued.*

covered with some small poplar, willow and some spruce and jackpine, and is rolling, sloping towards the McLeod, which flows through sections 2, 3 and 4. The northern portion of the township is chiefly spruce muskeg, with a few ridges of jackpine and poplar, and is not very suitable for farming. There are a number of creeks containing good water besides McLeod river. Fuel is very plentiful, but there are no minerals, stone quarries or water-powers. The climate is the same as that of Edmonton. No summer frosts were noticed. Bear, moose, grouse and partridge were seen. The creeks and river abound with fish of every description.—*R. V. Heathcott, D.L.S., 1907.*

*Range 19.*

**40.** (North outline.) Through the first mile and a half of this township the country consists chiefly of rolling land, covered with fallen timber, jackpine and spruce, suitable for building purposes. The soil is of a fairly good quality, consisting chiefly of loam.—*B. J. Saunders, D.L.S., 1908.*

**43 and 44.** (East outlines.) At the present time there are only pack trails into this country. Going into that country from the south one may leave the Canadian Pacific railway at Morley, Banff or Laggan. The routes from these three stations join at 'Kootenay plains,' on Saskatchewan river. On inquiry, I learned that when the snow is not too deep the pack trail from the last station is the best and shortest, but that it can only be used during the months of July, August, September and October, on account of the great depth of snow at the Pipestone-Siffleur summit. The country along these lines is broken, hilly and mountainous, thickly covered with small spruce, balsam and poplar. There are numerous large muskegs and streams of good water. The timber is generally small, but there is considerable large timber along Brazeau river, in range 20. Many indications of soft coal occur near the south boundary of township 43. Fire has previously devastated the whole section of country south of the Brazeau, and there exist vast sections of windfall and brulé.—*T. D. Green, D.L.S., 1908.*

**44.** (See report for township 44, range 17, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

**48.** (See report for township 48, range 18, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1907.*

**52.** The trail from Edmonton to Yellowhead pass crosses the northwest corner of this township. The soil on the north side of McLeod river is black loam, with clay and sand subsoil, and is very suitable for mixed farming. To the south of the river it is chiefly afloat with muskeg, with sand on the jackpine ridges, and is not well adapted for agricultural purposes. The surface is rolling and covered with small poplar, willow and jackpine in the northern portion; to the south and along the river bank it is spruce, tamarack and jackpine, up to thirty inches in diameter. There are some good hay lands around the lakes in the north of this township. Wood is plentiful everywhere. Water can be obtained from McLeod river, the lakes and numerous small creeks. It is all fresh water. There are no minerals, stone quarries or water-powers. Bear, moose and partridge were seen. The climate is the same as that of Edmonton.—*R. V. Heathcott, D.L.S., 1907.*

**53.** The pack trail from Edmonton to Yellowhead pass runs through the southern part of this township. The soil is black loam, with clay and sand subsoil, and suitable for mixed farming. The surface is rolling and covered with poplar, spruce and jack-



## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 19—Continued.*

pine, up to twelve inches in diameter, and can be used for building purposes. There are several small hay sloughs scattered through the township, also numerous small fresh water creeks. Wood for fuel is also plentiful. The climate is similar to that of Edmonton. There are no minerals, stone quarries or water-powers. Beds which are supposed to contain marl or gypsum lie in sections 5, 6 and 7, but no proper analysis has been made. Game consisting of bear, moose, grouse and partridge was seen. Sundance creek abounds with trout.—*R. V. Heathcott, D.L.S., 1907.*

*Range 20.*

43 and 44. (East outlines.) At the present time there are only pack trails into this country. Going into that country from the south one may leave the Canadian Pacific railway at Morley, Banff or Laggan. The routes from these three stations join at 'Kootenay plains,' on the Saskatchewan. On inquiry, I learned that when the snow is not too deep the pack trail from the last station is the best and shortest, but that it can only be used during the months of July, August, September and October, on account of the great depth of snow at the Pipestone-Siffleur summit. The country along these lines is broken, hilly and mountainous, thickly covered with small spruce, balsam and poplar. There are numerous large muskegs and streams of good water. The timber is generally small, but there is considerable large timber along Brazeau river, in range 20. Many indications of soft coal occur near the south boundary of township 43. Fire has previously devastated the whole section of country south of the Brazeau, and there exist vast sections of windfall and *brulé*.—*T. D. Green, D.L.S., 1908.*

*Ranges 20 and 21.*

48. Access to these townships is obtained by crossing McLeod river at 'Big eddy' and following the trail that leads up the west side of Embarras river. The soil is generally sandy loam, and gravel on the ridges, with vegetable mould and clay loam in the valley, and would probably raise good hay and oats, as well as potatoes and other garden produce. The country has been badly burnt over along the line, and is covered with small jackpine and willow brush, with a few meadows of small extent on the lower ground. There is a general ascent to the west and south, and generally in range 21 the surface is very broken, covered with dry standing timber, but fairly good grass is found in the valleys of the Embarras and its tributaries. No timber of commercial value is found in these townships, but probably sufficient for settlers' use and for fuel. No quantity of hay grows, except in ravines and gullies, which in this locality are small in extent. The surface is largely covered with willow brush and small jackpine. Water is fresh and the supply sufficient and permanent. The west fork of the Embarras is from one to one and one-quarter chains in width, six inches to three feet deep, has a current three to four miles per hour, and the adjoining lands are not liable to flooding. Power might be developed by damming the river where it cuts through the hills in range 21, as the fall is considerable above this point and the river very rapid. This locality is probably subject to summer frosts. The most readily available fuel is wood, of which there is abundance on all sides. There is said to be coal in range 21, several claims for which have been located, but no surveys made. Drift coal was observed in the river, but neither coal in place, stone quarries nor minerals of economic value were noticed. Game was very scarce, with the exception of a few traces of moose and bear.—*A. H. Hawkins, D.L.S., 1907.*



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 20.*

52. Yellowhead pass trail runs across this township about a mile south of the fourteenth base line. The soil, except on the north side of McLeod river, where it is black loam with clay subsoil and very well adapted for farming, is chiefly peat in the muskegs, with sandy ridges, and is very unsuitable for farming. The surface is rolling and covered with spruce, tamarack, jackpine and poplar. The spruce along the river measures up to three feet in diameter and will make good lumbering timber. The average size of the remainder is about ten inches. There are no hay lands. Water is supplied by McLeod river and several creeks of good fresh water. There is a large quantity of wood fuel, but no minerals, stone quarries or water-powers. Bear, moose, deer and partridge were seen. The climate is the same as that of Edmonton.—*R. V. Heathcott, D.L.S., 1907.*

53. There are no regular trails into this township, but it can be reached from the Yellowhead pass pack trail, which runs along McLeod river about a mile south of the fourteenth base line. The soil is a sandy loam, with clay, sand and gravel subsoil, and is not very suitable for farming. The surface is rolling and covered with spruce, tamarack and jackpine, with a few ridges of poplar. The timber will average about nine inches, and is suitable for building and fencing. There are a few hay sloughs scattered through the township, but they are of no importance. Water is plentiful in the numerous small creeks and lakes. There are no minerals, stone quarries or water-powers. Wood for fuel can be procured everywhere, as fire has been through most of the township and left quantities of dry wood. Bear, moose and partridge were the only game seen.—*R. V. Heathcott, D.L.S., 1907.*

56. (Part north outline.) This country is high rolling and covered with poplar and jackpine of thirty years' growth, while the bottom lands are covered with willow, alder and scrub, which would be easily cleared. From the base line the land slopes southward to a wide valley which occupies the centre of this township and beyond which rise high wooded hills. In the same valley, which continues in a northwesterly direction across township 53, flows a large creek intersecting the line in section 32. The whole country is covered with large dead trees, the remains of a forest of pine which had attained a diameter of twenty-four to thirty inches. The soil is clay mixed with sand, while the subsoil is generally gravel and stones.—*A. Saint Cyr, D.L.S., 1908.*

*Range 21.*

48. (See report for township 48, range 20, west of the fifth meridian).—*A. H. Hawkins, D.L.S., 1907.*

52. The only possible way of reaching this township in the summer months is by pack trail from Lake St. Ann settlement. By using sleighs in the winter a very good road has been opened up which follows the greater part of the way, lakes, rivers and sloughs. As it is possible to take a heavy load the whole distance, it is found that this is the more economical way of taking supplies into this country. From the report furnished the Department by Mr. Ross, D.L.S., in connection with the survey of the thirteenth base line I expected to be able to use wagons as far as Chip lake, but this I found to be impracticable at least in the earlier part of the season owing to continuous wet weather and the abnormal traffic over it by teams employed in the construction of the Grand Trunk Pacific railway. Although the contractors, Messrs. Foley Bros. and Stewart, were continually improving and changing this road, especially that portion south of Chip lake, it was impossible for a team to take anything more than an empty wagon over it. There are two pack trails as far as the "Big eddy" on

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 21—Continued.*

McLeod river, one is known as "Jock's" trail and the other the "Jasper" trail. Both these trails cross Pembina river at the old crossing or the "Jasper crossing." The first mentioned trail turns to the north of Chip lake as far as township 56 and thence in a southwesterly direction to the "Big eddy," the latter trail however runs almost due west, passing south of Chip lake and is by far the shorter trail. I found however that the first mentioned trail was the more suitable, although two days longer, owing to its being fairly dry in rainy weather, also on account of an abundance of feed for horses at all seasons. I found the "Jasper" trail very bad and almost impassable owing to its crossing a large number of wide and soft muskegs, long and continuous stretches of fallen timber, and also to the unsatisfactory condition of bridges. From the "Big eddy" the trail follows along McLeod river. I used this trail in the survey of this township to within three miles of The Leavings; from there I found it necessary to open a trail about four miles south to the centre of the township. As the rivers and lakes had broken up before I received instructions for this work I was unable to take in any of my outfit or provisions over the ice. The soil of this township is not of the very best; the higher ground has evidently been subjected to a succession of very severe fires which have burnt off the loam and left the clay subsoil hard and barren. This township is also unusually rough and for this reason not adapted for cultivation. A few quarter sections may be found here and there which would be suitable as homesteads but the greater portion would only be useful for grazing purposes. The township as a whole might be called scrubby although there are patches here and there of timber and *brulé* which have been burnt clear of stumps. The timber found in this township is not of commercial value with the exception of a strip along McLeod river, the balance, which is scattered areas, would be suitable only for a reservation for the settler. There is no hay of any value or extent in this township, the low ground being in almost every case a muskeg and unsuitable for hay unless drained. The water is of the very best, free from all alkaline or other impure substances. There is an abundance of springs and spring creeks flowing into McLeod river which passes through the northern part of this township. The climate is similar to that of the Edmonton district but is probably subject to earlier frosts and to excessive hail storms which follow the valley of McLeod river. The fuel at present that can be most readily procured is wood, but there is an unlimited supply of coal in the valley of McLeod river within a comparatively short distance.—*A. E. Farncomb, D.L.S., 1908.*

**56.** (North outline.) This township includes in its western half the valley of the Athabaska. This stream here flows north. In the eastern half lies some high land, alternating with spruce and tamarack swamps in sections 32, 34 and 36. In these the trees do not average more than eight inches. On the high land poplar and jackpine grow, while a few birch trees were also seen near the river. The land in this township is drained by a good sized stream rising in the hills, six or eight miles south of the line. Between its banks and the foot of the hills is some prairie land with first-class soil, but as the valley is narrow these prairies are of limited extent. The stream crosses the north boundary of this township near the corner of section 32, and two miles farther it joins Athabaska river. The soil is clay mixed with sand from four to eight inches deep, while the subsoil is invariably stony or gravel. As this country is not at present densely wooded and without any sort of trail, it will probably not be settled for a long time. At the crossing of the Athabaska, in the middle of section 31, the river is two hundred yards wide, is quite deep and flows northward at the rate of five or six miles an hour through a single channel. From the water's edge, along the right bank, rise perpendicular cliffs of sandstone, while the top of the left bank is not

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 21—Continued.*

more than five feet above the water. Half a mile north of the base line the stream bifurcates around a small wooded island, and a short distance below there is a bad rapid, where the water rushes underneath some overhanging rocky ledges, a dangerous spot which it would be hard to avoid with any kind of craft. I noticed several such rapids in this stretch of river. The valley of the stream above referred to is connected with the valley in range 20 by a traversed depression one mile south of the base, bearing east and west. Along the stream which drains this township beaver have for a long time been at work and appear to be getting very numerous, as evidenced by many new dams built at short intervals across its course. The remains of some old works which had been broken by the trappers are still visible, but now that all these trails have been made impassable by fallen timber, they do not visit this part of the country any more.—*A. Saint Cyr, D.L.S., 1908.*

*Ranges 22, 23, 24 and 25.*

48. Access to these townships is to be had by following the trail along McLeod river; for those lying west of the river the trail leaves the McLeod two miles north of the thirteenth base line, and for those lying east of the McLeod the trail follows up the river to the first large creek that comes in from the north and thence up this creek. The soil is all of a very sandy nature, except muskegs, where vegetable mould prevails, and is probably best adapted for forest culture, except along the valley of the McLeod, which is from one-half to three-quarters of a mile wide extending from seven to ten miles up the stream with but two or three small breaks for the entire distance. It is called locally 'Big prairie,' and is well adapted for hay, which could be cut in places without improvement, and would probably raise oats, potatoes and other garden produce, and would undoubtedly be an admirable range for the raising of cattle and horses. The surface is rolling and broken with many muskegs, and all timbered except the valley of the river. Some very fair pine and spruce is found along this line, cut up, however, by muskegs. Timber ranges from six to twenty-six inches in diameter, and is located at intervals all along these four ranges. Hay could be cut on 'Big prairie,' and with small improvements the quantity is unlimited. The water is fresh and abundant. McLeod river is one and a half chains wide, one to three feet deep, has a current of three and a half to five and a half miles per hour, and does not often flood its banks. Water-powers could be developed higher up the river. This locality is said to be subject to summer frosts. Wood is the only fuel, and is said to be abundant on all sides. No coal or lignite veins, stone quarries or minerals of economic value were noticed. Traces of bear, deer and moose were noticed, and a few grouse and, occasionally, ducks were seen, but game was generally scarce. A number of bull-trout were caught in McLeod river.—*A. H. Hawkins, D.L.S., 1908.*

*Range 22.*

52. The only possible way of reaching this township is by pack train in the summer months from Lake St. Ann settlement or Entwistle or by using sleighs in the winter. A very good winter road has been opened which to a great extent follows the lakes, rivers and sloughs. As it is possible to take a heavy load the whole distance, it has been found to be the most economical way of taking supplies into this country. From the report furnished the Department by Mr. Ross, D.L.S., in connection with the survey of the thirteenth base line, I expected to be able to use wagons as far as the west end of Chip lake, but this I found to be impracticable, at least in the earlier part of the season, owing to the continuous wet weather and the abnormal traffic over

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 22—Continued.*

it of teams employed in the construction of the Grand Trunk Pacific railway. Although the contractors, Messrs. Foley Bros. and Stewart were continually changing and improving this trail, especially the portion south of Chip lake, it was impossible for a team to take anything more than an empty wagon over it. There are two pack trails as far as the 'Big eddy' on McLeod river; one is known as 'Jock's' trail and the other the "Jasper" trail. Both these trails cross the Pembina river at the old crossing or the "Jasper" crossing, but the former trail turns north of Chip lake as far as township 56 and thence in a southwesterly direction to the "Big eddy." The latter trail however runs almost due west passing south of Chip lake and is by far the shorter trail. I found that the first mentioned trail was the more suitable, although two days longer, owing to its being fairly dry in rainy weather, also on account of an abundance of feed for horses through the summer months. I found the "Jasper" trail very bad and almost impassable owing to a great extent to its crossing a large number of wide and soft muskegs, long and continuous stretches of fallen timber, and also to the unsatisfactory condition of bridges, corduroys, &c. The feed also along this trail was very scarce owing to the large number of horses used on railway construction pasturing along it. From the "Big eddy" the trail follows along McLeod river. I used this trail in the survey of this township as far as The Leavings, and from there I followed a trail which continues up McLeod river. I also opened up and used an old disused trail which crosses the township along the first tie-line south of the base line. From Lac Ste Anne it took about thirteen days to reach the camp with a load and three weeks for a round trip. The soil in this township is of a very inferior quality, being either gravel or a very hard clay, the top soil or loam having been burnt off making it very unsuitable for agricultural purposes. The whole of this township with the exception of the southeast corner is covered by the Yellowhead mountains, being a range of very high and broken hills, which is the divide between Athabaska and McLeod rivers. It is also cut by the valley of the McLeod river rendering it valueless from an agricultural standpoint. The township as a whole might be described as being covered with *brulé* or dead fallen timber, which in some cases is piled as high as ten feet, with a dense second growth of small jackpine. Small areas of timber are found in sections 18, 19, 32 and 33 being all that is left of an immense forest covering the whole township. These small areas, however, are not of a sufficient size to be of any commercial value. The water in this township is unusually plentiful and of good quality, the source being springs flowing from the hills into Athabaska and McLeod rivers.—A. E. Farncomb, D.L.S., 1908.

53. The only possible way of reaching this township is by pack train in the summer months from Lake St. Ann settlement or Entwistle or by using sleighs in the winter. A very good winter road has been opened up which to a great extent follows lakes, rivers and muskegs. As it is possible to take a heavy load the whole distance, it has been found the most economical way of taking in supplies. From the report furnished the Department by Mr. Ross, D.L.S., in connection with the survey of the thirteenth base line, I expected to be able to team all my outfit at least to Chip lake, but this I found to be impossible, at least in the earlier part of the season, owing to continuous wet weather and the abnormal traffic over the trail of teams employed in the construction of the Grand Trunk Pacific railway. Although the contractors working on the above railway, Messrs. Foley Bros. and Stewart, were continually improving and changing this road, especially that portion south of Chip lake, it was impossible for a team to haul anything more than an empty wagon. There are two pack trails as far as the "Big eddy" on McLeod river; one is known as "Jock's" trail, and the other the "Jasper" trail. Both these trails cross Pembina river at the old crossing, or what is known as the "Jasper crossing," the former trail taking a

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 22—Continued.*

northwesterly course as far as township 56 and thence in a southwesterly direction to the "Big eddy"; the latter trail, however, runs almost due west following in the vicinity of the thirteenth base line and is by far the shorter trail. I found, however, that the first mentioned trail was the more suitable, although two days longer, owing to its being fairly dry in rainy weather, also on account of an abundance of feed for horses at all seasons. I found the "Jasper trail very bad and almost impassable for anything but unloaded horses owing to a great extent to its crossing a number of large and soft muskegs, long and continuous stretches of fallen timber being across the trail, and also to the unsafe condition of the bridges. From the 'Big eddy' the trail follows along McLeod river. I used this trail in the survey of this township as far as 'The Leavings'; from there I followed the north trail west about six miles, and from that point I located and opened a new trail about eight miles northeast to the centre of the township. From lake St. Ann with a load it took fourteen days to reach the camp, and three weeks to make a round trip. The soil at one time in this township was no doubt of the very best, but a succession of severe fires has burnt off the loam and baked the subsoil, although a very fair vegetation would indicate that it is capable of raising a very fair crop. The general condition of the surface, however, is too rough for the cultivation of any considerable areas, although here and there areas may be found sufficiently level to allow of its being utilized in this way. Large areas of muskegs, which at present are too wet for cultivation or ranging stock, may be very readily drained and made into the best of land. The greater portion of the township is timbered, although not of commercial value, the central and western portions being covered with scrub, with patches of spruce where the ground is inclined to be low and wet. The timber in this township is confined to a strip extending from lake No. 1 to the northeast corner of the township, but it is not of any great commercial value, as it would not average over eight inches in diameter. There are other patches here and there through the township which are not of sufficient extent for commercial purposes, but might be useful to the settler. There is no hay in this township which could be utilized unless considerable work was done in the way of drainage. The water is very plentiful and good, free from all alkaline or other injurious substances. Numerous springs and spring creeks are found in different parts of the township, especially on the slope to the Athabaska.—*A. E. Farncomb, D.L.S., 1908.*

56. (North outline.) The east boundary of this township follows the edge of a bench west of the Athabaska. The country here is lightly timbered with aspen, and there are a few scattered clumps of jackpine on the top of the ridges. Hay meadows are found at some distance north of a small creek which crosses the line several times before it empties into the river. Across these meadows and through the 'greenbush' which grows in this vicinity passes an old pack trail which, although not travelled for a great many years, is still visible in section 31, range 21. It cannot, however, be followed more than two miles south to where the *brulé* begins, and any further traces of it become obliterated under a mass of windfall. For that reason, the Indian hunters had to find another route farther west when going to the valley of Baptiste river, their old hunting grounds. The height of land (3,700 feet above the sea) between the valleys of Athabaska and Hay rivers is passed in the middle of this range. West of the summit the land remains fairly level through section 33, the west half of which is covered with tamarack and jackpine six to nine inches, and spruce and balsam six to twelve inches. Half of sections 31 and 32 are in swamps separated by strips of dry land supporting a stunted growth of aspen and jackpine. The soil is clay or clay loam overlying a stony subsoil.—*A. Saint Cyr, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 23.*

48. (See report for township 48, range 22, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

52. The only possible way of reaching this township is by pack train in the summer and in the winter by sleigh road to 'The Leavings' on McLeod river, but from there to the township the only possible way is by pack train a distance of about eight miles. The winter route is by far the most economical. As I had not time after receiving my instructions to have my provisions taken in over the ice I was compelled to take everything in over the pack trail. There are two pack trails as far as the 'Big eddy' on McLeod river, one is known as 'Jock's' trail, and the other the 'Jasper' trail. I found, however, that it was impossible to use the latter trail owing to the crossing of a large number of wide and soft muskegs which were almost impassable from continuous wet weather in May and June which carried away the bridges and destroyed the corduroys across the soft places. 'Jock's' trail although two days longer was far the better as it follows high ground and also as there is abundance of feed for horses. I found it necessary to open up a considerable portion of the old 'Jasper' trail from 'The Leavings' on McLeod river in order to reach the work, as the present trail to the Yellowhead pass crosses the divide between McLeod and Athabaska rivers about six miles farther south, the old trail being almost completely abandoned. The top soil in this township on the whole is probably better than that of the adjoining ones as it has not been subjected to fire to any great extent with the exception of the more southerly portions. This is largely due to a precipitous slope of the whole township to the north. The eastern outline follows along the divide between Athabaska and McLeod rivers which reaches a height of about 1,500 feet above either river, and the land falls from this outline to the Athabaska, the whole area being covered by spruce, jackpine and poplar which would average about eight inches in diameter. This area is swampy and wet from innumerable springs which flow from the hills, and from which cause, and from the slight evaporation owing to its northern slope, has preserved this area from fire. The subsoil, however, is either sand or gravel and for this reason and the very rough nature of the surface would render it unfit for agricultural purposes of any kind. The southern third of the township is high land probably 1,200 feet above Athabaska river and has been subjected to a succession of very severe fires which have burned off the top soil, the whole being covered with a thick growth of small pine. The fuel which at present can be most readily procured is wood, but there is every indication of coal along the banks of Athabaska river which may be found in sufficient quantities and developed in the future. This township is well watered by the Athabaska and from innumerable springs which rise in the west slope of the divide and flow into the Athabaska, all of which is free from alkali. There is no hay in this township of any value for ranching purposes. The whole of the northern two-thirds of this township is covered with timber as above mentioned, some of good quality, but the greater portion, however, being more suitable for ties than for lumber.—*A. E. Farncomb, D.L.S., 1908.*

53. The only possible way of reaching the township is by pack train in the summer and in the winter by a sleigh road to "The Leavings" on McLeod river, but from there to the township the only possible way is by pack trail a distance of about eight miles. The winter route is by far the most economical, the present rate for provisions to the surveys being about four cents per hundred pounds, whereas the rate in summer by pack trail is about eight cents per hundred pounds. As I had not time after receiving instructions to have my provisions taken in over the ice, I was compelled to take everything in over the pack trail. There are two pack trails as far as the 'Big eddy' on McLeod river, one is known as 'Jock's' trail and the other the



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 23—Continued.*

'Jasper' trail. I found, however, that it was impossible to use the latter trail owing to the crossing of a large number of wide and soft muskegs which were almost impassable from continuous wet weather in May and June which carried away the bridges and destroyed the corduroys across the soft places. "Jock's" trail although two days longer was far the better as it follows higher ground and also as there is an abundance of feed for horses. I found it necessary to open up a considerable portion of the old 'Jasper' trail from 'The Leavings' on McLeod river, in order to reach the work as the present trail to the Yellowhead pass crosses the divide between McLeod and Athabaska rivers about six miles farther south, the old trail being almost completely abandoned. The soil in this township on both sides of the Athabaska is of a very inferior quality and not suitable for agricultural purposes, being either very sandy on the lower ridges or hardpan on the hills. The township on the whole is very rough and would, in my opinion, be suitable only for grazing purposes. It is well watered by Athabaska river which passes diagonally from the southwest to the northeast corner and by innumerable springs which rise in the hills and flow into the Athabaska from both sides. The water is unusually good and free from all alkaline or injurious minerals. Hay in this township is very scarce but a poor variety might be found along the river bottom but not of sufficient quantity to be of any value. There is a little timber scattered throughout the township, especially to the northwest, but not of sufficient extent to be of any commercial value. The whole of the township has evidently been subjected to a succession of severe fires which have only left the timber in the muskegs and coulées, the areas burnt being now covered by small jackpine, small poplar and willow. The fuel which would most readily be obtained at present is wood, although there is every indication of coal areas along the Athabaska, which may be developed in the future.—*A. E. Farncomb, D.L.S., 1908.*

56. (North outline.) West of the northeast corner of this township the land is covered with thick brush and slopes gradually towards the valley of a creek which crosses the line twice in section 36. Beyond that stream is a plateau where jackpine is growing so thick that it is almost impossible for a man to make his way through it. In section 33 we came to the western edge of this plateau, and three-quarters of a mile farther west Hay river was seen flowing northwards in a valley sixty chains wide and four hundred and fifty feet below the general elevation of the adjoining country. The north boundary of this township intersects this river in the middle of section 32. Its banks here are low, and the distance between them is two hundred yards. The main channel of the river runs close to the right bank, is five feet deep and not more than three chains wide. Another channel, separated from the main one by high gravel bars covered with willow, was dry at the time of the survey (September). In section 5, township 57, range 23, there is a lake half a mile long. It lies along the foot of the hills west of Hay river. From the left bank and on the line extends a flat on which grow some large spruce trees. It ends half a mile farther at a bench two hundred and fifty feet high. The soil through this section of country is clay underlain with stones.—*A. Saint Cyr, D.L.S., 1908.*

*Range 24.*

48. (See report for township 48, range 22, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908.*

52. The only possible way of reaching this township is by pack trail in the summer and in the winter by a sleigh road to 'The Leavings' on McLeod river; from this point, however, it is necessary to use pack horses to the Athabaska, as it is very rough and no winter road has been opened. The winter route is the most economical way.



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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 24—Continued.*

of taking provisions in, the winter rate being four cents per hundred pounds and the summer rate by pack horse eight cents per hundred pounds. As I had not time after receiving instructions to have my provisions sent in over the ice, I was compelled to take everything in over the pack trail. There are two pack trails as far as the 'Big eddy' on McLeod river, one is known as 'Jock's' trail and the other the 'Jasper' trail. I found, however, that it was impossible to use the latter trail, owing to its crossing a large number of wide and soft muskegs, which are almost impassable from continuous wet weather in May and June, which carried away the bridges and destroyed the corduroys across the soft places. 'Jock's' trail, although two days longer, was far the better, as it follows high ground and also as there is an abundance of feed for horses. I found it necessary to open up a considerable portion of the old Jasper trail from 'The Leavings' on McLeod river to Athabaska river in order to reach the work, as the present trail to the Yellowhead pass crosses the divide between McLeod and Athabaska rivers about six miles farther south, the old trail being almost completely abandoned. The soil over the greater portion of this township is varied, the hills being burnt bare and covered with very little vegetation, and the level portions being covered with muskegs. The general surface is very broken, rendering it unfit for cultivation, with the exception of bottom lands along the Athabaska, which extend about one mile north and three miles down stream from the west outline, and also occasional areas scattered throughout the township. About one-quarter of the area of the township might be cropped, but the balance is only suitable for grazing. Along some of the side hills is found excellent grazing, they being covered by peavine and other varieties of grasses. The northwest corner of the township is on an elevation of 1,000 feet above the Athabaska, the surface being a succession of ridges and precipitous drops cut by canyons. In the southeasterly portion of this township, covering sections 1, 2 and 3 and sections 12, 11 and 10, there is some fairly level land which is cut by small areas of muskegs. This whole area, however, has been subjected to a succession of severe fires which have burned off the loam and baked the clay subsoil to such an extent that I found great difficulty in excavating for the pits. I am very doubtful that this area would be suitable for farming purposes, as all the vegetable matter appears to have been burned from the soil. The township might be described as being covered by scrub, although there is a belt of very fine timber along each bank of the Athabaska. This, however, extends only about half a mile back from the river and three miles up stream from the east outline. There is also good timber in the northwest corner of the township, which covers part of section 30 and the whole of section 31; with these exceptions, there is no other timber in this township of any commercial value. The water in this township is abundant and of the very best quality, being supplied by innumerable spring creeks which flow into the Athabaska, flowing diagonally across the township. There is a little hay to be found along the bottoms of the Athabaska described above, but otherwise the areas are limited to small sloughs and around the margins of muskegs. The fuel which at present can be most readily procured is wood, but there is every indication of coal along the banks of the Athabaska, which may be found in sufficient quantities to be developed in the future.—*A. E. Farncomb, D.L.S., 1908.*

56. (North outline.) Hay river enters this township near its southwest corner, and two miles farther receives its largest tributary from the west. This affluent is the same which crosses the sixth meridian in section 13, township 55. Two miles below the junction Hay river turns almost due east across township 56, range 24, which it leaves in section 25. This width of the valley proper varies from half a mile to three-quarters of a mile. Wild hay grows on a few of the flats next to the river,

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 24—Continued.*

but the majority support a good growth of spruce from eight to twenty-four inches in diameter. This timber, being of good quality and conveniently situated, will become valuable as it is the only standing timber spared by the fires which overran this district years ago. West of Hay river is a plateau which supports only a stunted growth of aspen and jackpine. Adjacent to the line are also large areas of moss-covered land, void of vegetation and in spots very stony. In section 34 the land begins to slope towards the wide depression in which flows Baptiste river, whose high cut banks are plainly seen at six or eight miles north of the base line. When nearing range 25 the country is broken again by deep narrow valleys with small streams, all flowing northward. Bad windfall reappear on the highlands, while in the valleys still grow a few spruce and jackpine. Far to the west is seen a great valley, beyond which lies the rough country where a year ago I surveyed the sixth meridian. Looking south from the north boundary of this township I noticed, in section 26, a lake on the bench within a quarter of a mile of the right bank of Hay river, and beyond it a forest of firekilled trees which stretches away also to the southeast as far as the eye can reach. The soil on the highland is gravelly and stony; in the bottoms it is generally loam or clay mixed with sand, but the subsoil is everywhere stony.—*A. Saint Cyr, D.L.S., 1908.*

81. This township is divided into two parts, by Peace river, which enters the township in sections 17 and 18 and flows northeasterly through the centre of the township. That part of the township which lies to the southeast of the river can be reached only by crossing the river from the northwest side. This portion of the township is heavily timbered with poplar, spruce, balm of Gilead, cottonwood, white birch and willow. Starting at the river the hills rise in about one mile and a quarter from the river, to a height of eight hundred feet; from the top of this rise back from the river the country is nearly level. Adjoining the river banks are a few narrow strips of flat country. On the level back from the river the poplar averages about ten inches in diameter, the spruce eighteen inches and the birch six inches. On the hills and near the river, the poplar is larger, averaging twelve inches or more, the spruce ten inches and the cottonwood twenty inches, some of the latter being as large as four and one-half feet in diameter. The several varieties of timber are well distributed over all sections of this part of the township. The undergrowth is dense. The soil consists of from one to three inches of humus or black loam overlying clay subsoil. With the exception of a marsh in sections 2 and 3, no hay could be cut, though pasture in the form of peavine and grasses is found in the woods. Later in the summer water is very scarce at the top of the hill, and what there is is very hard and slightly alkaline. There are no streams and no lands are liable to be flooded. During this season no frosts occurred until late in August. Wood for fuel is plentiful. No coal or lignite veins were found. No stone whatever occurs, and no minerals were seen. A considerable number of ducks, a few ruffed grouse, geese and swans were seen. There are quite a number of moose and bear. A few beaver were seen around the banks of Peace river, but there are very few left in the country. With the exception of sections 31 and 32, which are nearly level, all that portion of this township which lies on the left bank of the river consists of rough hilly country, intersected by deep canyons down which small streams trickle. These creeks, after carrying off the spring flood water practically dry up; a few of the larger ones have a little water in them all summer. The hills are almost bare, but every little depression is filled with a dense tangle of scrub, poplar and willow. The ravines and canyons contain a small amount of timber, a few spruce averaging about eighteen inches in diameter and poplar averaging six inches in diameter. About fifty per cent of this part of the township is open. The soil is

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 24—Continued.*

two or three inches of black loam on a clay subsoil. The hills are so well drained that it would be practically impossible to raise any crop on them. A good pack trail follows the river bank from Shaftsbury settlement through this township to Dunvegan, more than fifty miles up the river. A wagon could be used in sections 31 and 32. A small creek runs through sections 33, 28 and 22. This water is very hard and the volume in summer is very small. No lands are liable to be flooded. No water-power could be developed. Practically no hay could be cut, but there is good pasture. Summer frosts rarely occur. Loose stones occur in places, especially near the banks of the river, but no stone in place was seen. Fuel in the form of small poplar and willow occurs throughout this portion of the township. No coal or lignite veins nor economically valuable minerals were seen, though a little float coal was picked up on the shore of the river. Peace river flows through this township at a rapid rate, the current averages two and one-half to three miles an hour. The river is about thirty chains wide, but numerous islands make many channels, some of which are dry at low water (August until the following spring.) The river water is fresh and not so hard as the other water in the country. In the spring flood the water rises from ten to eighteen feet but does no damage, as the banks are high. A few prairie-chicken, ruffed grouse, geese, duck, sand-hill crane and some sign of bear were seen.—*H. S. Holcroft, D.L.S., 1908.*

82. There are two main trails coming up the hill from Shaftsbury settlement in Peace river to this township, one from the rear of Lot No. 12, known as 'Brick's' trail, and one from Indian reserve No. 151 C, known as 'Xavier's' trail. Both of these trails are in fair condition but the ascent from Peace river to the top of the hill is about six hundred and fifty feet. 'Brick's' trail passes through sections 36, 35, 34, 33, 32 and 31, while 'Xavier's' trail passes through sections 1, 2, 11, 10, 9, 16, 17 and 18. From the top of the hill back from the river both these trails are good. They join in township 82, range 25, and pass by 'Old Wive's' lake to Dunvegan. The soil is black loam with a depth varying from two inches to six inches, overlying a subsoil of clay in the southern and eastern portions of the township, and a gravel subsoil in the northerly and westerly portions. The soil is suitable for growing all the products of the country. About fifty per cent of the township is open while most of the remainder is covered with willow and small poplar. All that part of the township lying to the southeast of a line drawn from the southeast corner of section 5 to the quarter section post on the east boundary of section 13 is hilly and broken by numerous ravines. The remainder of the township is gently rolling. A few spruce averaging from eight inches to ten inches in diameter occur in the ravines in sections 4, 12, 13, 14 and 24. Scattered throughout the remainder of the township are numerous bluffs of small poplar, with an occasional poplar averaging eight inches in diameter. No slough hay occurs. Upland hay could be cut in a moist season in sections 19, 20, 29, 30, 32, 21, 28, 33 and 27. The only places in this township where water occurs on the surface are in three small creeks, one heading in section 14, one in section 23, and one in section 4. These creeks head from springs; the water where it comes out of the ground is fresh but quickly becomes hard and slightly alkaline by absorption of salts from the surface soil; these springs are permanent. The remainder of the township is practically dry in summer time. No floods are liable to occur. No water-power of any importance could be developed. The climate is mild and warm. During the past summer no frosts occurred, and the season was rather dry. A fine autumn was experienced. Fuel consisting of poplar, willow and some spruce is plentifully distributed throughout the township. No coal or lignite veins, nor minerals of economic value were seen. No stone in place was discovered. Game is scarce. A

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## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 24—Continued.*

few prairie-chicken, ruffed grouse, red foxes and coyotes were seen. Indian reserve No. 151 occupies the greater part of sections 20, 27, 28, 29, 32, 33 and 34. This is used principally as a hay reserve.—*H. S. Holcroft, D.L.S., 1908.*

*Range 25.*

48. (See report for township 48, range 22, west of the fifth meridian).—*A. H. Hawkins, D.L.S., 1908.*

81. A trail which leaves lot No. 1 of Shaftsbury settlement enters this township in section 33. This trail is in moderately good condition. The soil in this township consists of a layer of black loam varying from two to eight inches deep overlying a clay subsoil and should be suitable for growing all varieties of cereals and vegetables. The north half of the township is partly open. Bluffs of small poplar and willow are scattered throughout this portion of the township. Sections 4, 5 and 8 are also more or less open, while the remainder of the township is covered with a more or less dense growth of small poplar, balm of Gilead and willow. In sections 2, 3, 5, 6, 7, 12 and 13 are a few scattered spruce. In a large deep valley in sections 4, 5, 6, 7 and 18, and in sections close to Peace river, sections 2, 3, 10, 11, 12, 13, 14 and 24, the timber is heavier. Poplar and balm of Gilead run up to fourteen inches in diameter. The northern half of the township is rolling, the remainder rough and broken by hills and valleys especially near Peace river. A creek passing through sections 5, 6 and 7 runs in a valley of one hundred and fifty to one hundred and eighty feet deep with steep banks. This creek, with Coldsprings creek, which passes through sections 33, 28, 22, 21, 15, 10, 3 and 2, and Peace river, provide water for the township. These are the only places from which water can at present be procured, the remainder of the township being quite dry. Coldsprings creek rises from some cold springs in Indian reserve No. 151A just north of this township. The water in this creek is clear, cold, fresh and hard, the volume varies but slightly the whole year round. This creek averages about five or six feet in width and eight to twelve inches deep and flows softly. A considerable portion of the more level portions of this township could be irrigated from this creek. The valley of this creek is rather wide for damming it for power purposes. No land is liable to be flooded. One hay meadow occurs in section 32, but upland hay could be cut in most of the open places in the northern portion of the township. Fires run through the country every year, being started by those who have horses ranging out, these fires decrease the wooded area yearly and this year the fires burned so fiercely that they retarded the growth of the grass considerably. During the months of April, May and June the climate was mild and dry, a couple of light frosts occurred late in May, but did no harm. Sufficient rain fell to do considerable good for vegetation. No coal or lignite veins, stone in place or economically valuable minerals were discovered. Float coal was seen along the shores of Peace river. Bear and moose were seen, also a few prairie-chicken and ruffed grouse; ducks and geese flew over in large numbers. Signs of marten, foxes and coyotes were seen. There are no gophers or badgers. Evidences are present that elk once existed in this township but there are none now. The whole township would make an excellent ranching country, and the northern half a fine farming country.—*H. S. Holcroft, D.L.S., 1908.*

*Ranges 26, 27 and 28.*

48. The route for reaching these townships is by way of the Jasper trail to Prairie creek from which place trails lead to all the accessible portions. The western portion of township 48, range 27, is right along the 'Jasper' trail. The whole of range 26 lies in the mountains and is very rugged and broken, being traversed by Fold-

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Ranges 26, 27 and 28—Continued.*

ing mountains and also the Fiddle Creek range. The Folding mountains are covered with scant vegetation, but the Fiddle Creek range is composed of bold rugged peaks of bare rock. From the centre of range 27 the line passes over rolling hills upon which is considerable windfall, supporting in many places a luxuriant growth of grass, but is rather rolling and broken for cultivation. Range 28 lies wholly in the Athabaska valley but is rather marshy and crossed by numerous branches of the river and cuts along close to the south end of Mud lake which is formed by an overflow of the Athabaska. The timber is small on the east side but is rather large and fine and very thick after crossing the river. A very nice flat was noticed just north of the line on the west side of the Athabaska. Some very fine hay was observed in the various meadows to the north of Mud lake. The water is fresh and permanent in Fiddle creek and Athabaska river but Drystone creek was quite dry in August and is said to dry up each season. There are several good water-powers on Fiddle creek which could be developed by damming in numerous places where the creek cuts through the mountains. It ranges from fifty to eighty feet wide, and six inches to two feet deep, with a current four to six miles per hour. No water-power occurs along the Athabaska in this locality and the banks are subject to flooding during June and July. The Athabaska is four to ten chains wide, one to ten feet deep, and has a current very swift and treacherous, four to six and a half miles per hour. The water is milky in colour but good. Summer frosts are very rare in the valley but of frequent occurrence on the mountains. The available fuel is wood and is readily procured in many places. No coal or lignite veins were noticed. Limestone could be quarried in many places along the Fiddle Creek range; it appears to be of good quality and the supply is unlimited. No minerals of economic value were noticed although it is reported that there are several mineral claims staked in this locality. Near the head of the south and main fork of Fiddle creek are several hot sulphur springs situated about twelve or fifteen miles up the valley of Fiddle creek, from the Jasper trail, and may be reached by a trail leading from the Jasper trail near its crossing of Fiddle creek. Mountain sheep, red deer, a few moose, bear, wolves and foxes are to be found but are not at all numerous. There are said to be jackfish in the Athabaska and trout in the smaller streams.—*A. H. Hawkins, D.L.S., 1908.*

*Range 27.*

48. (See report for township 48, range 26, west of the fifth meridian.)—*A. H. Hawkins, D.L.S., 1908*

49 and 50. These townships are easily accessible from the Jasper trail. They lie in the valley of Athabaska river; the soil is a sandy loam and very fertile in places, but becomes very sandy and gravelly near Brulé lake and Athabaska river and is not suitable for cultivation. To the east and along the Jasper trail are, however, some very fine tracts that could be easily cultivated, as evidenced by Mr. Gregg's ranch in township 50, range 26, along Prairie creek. At the time of my visit in August, garden produce was growing in great luxuriance and a small field of oats gave promise of an abundant yield. Mr. Gregg has quite a large drove of ponies and four or five cattle as well as a number of chickens, and has an ideal location. Several very desirable positions were noticed along Athabaska valley on the way down, which will doubtless soon be occupied. The surface was rolling and wooded along Athabaska river and Prairie creek with occasional considerable stretches of prairie. The timber is very fine and large in some places along the river but is small and rather stunted in growth as it leaves the water, and all of it is rather limby and rough. The water is all fresh and the supply abundant both in Prairie creek and in the Athabaska river. Power could

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

*Range 27—Continued*

be developed along Prairie creek in places by damming but no falls were noticed. The climate is said to be mild and equable the year round, very little snow falls in the valley and not much severe weather, with scarcely ever a summer frost as it is well sheltered on all sides by the mountains. Wood is the fuel most readily available and is abundant and near at hand at almost all points. No veins of coal or lignite were noticed. Game was scarce; a few traces of deer and bear were noticed but this locality is fairly well hunted. There are mountain trout in Prairie creek and jackfish and goldeye in the Athabaska. No minerals of economic value were noticed and no stone quarries except the mountains which afford an abundant supply of excellent limestone.—*A. H. Hawkins, D.L.S., 1908.*

*Range 28.*

48. (See report for township 48, range 26, west of the fifth meridian).—*A. H. Hawkins, D.L.S., 1908.*

## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 3.*

79. This township is timbered with poplar, spruce and large willow; it is nearly level through the northern half but rolling and hilly towards the south portion. The soil is black loam varying from four to six inches in depth and overlying a clay subsoil. Brulé river crosses this township near the southeast corner and Spirit river, a tributary of Brulé river, passes at a short distance north of the correction line. Spruce from six to eighteen inches in diameter is found in large quantities along those two streams. There is no road to communicate with this township. The game found in that country is moose, bear, marten, coyotes and foxes. The climate is good with no early summer frosts.—*J. B. Saint Cyr, D.L.S., 1908.*

80. This township can be reached by the Green island road connecting with the Peace River Crossing and Dunvegan wagon road. The soil is suitable for farming purposes as it is composed of black loam varying in depth from four to five inches and overlying a clay or sandy clay subsoil. The surface is prairie and bluffs, and the country is undulating with the exception of the neighbourhood of Peace river and the different creeks draining this township, where it is hilly. Timber such as spruce and poplar for building and fencing purposes is plentiful. Fuel can be procured on almost every section of this township. Prairie and slough hay is also plentiful all through this country. Most of the creeks were dry at the time of the survey and those which were running contained hard alkaline water. The settlers intending to stay in that country would have to dam those creeks in order to keep a supply of water to last them all the year round. This can easily be done as the bottom of those ravines is very narrow. There are no water-powers and no mineral of any description has been found during the subdivision of that township. The climate is good with no early summer frosts. There is a limestone quarry on section 6 of this township. There is also an Indian reserve No. 152A in this township; it is partly situated on sections 4, 5, 8 and 9. The hills on the south side of Peace river are densely covered with spruce, averaging fifteen inches in diameter and suitable for lumbering purposes. The water of Peace river is very good and clear and the current is about four miles an hour. With the exception of a few coyotes and foxes, no game has been seen here.—*J. B. Saint Cyr, D.L.S., 1908.*



## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 4.*

80. The Peace River Crossing and Dunvegan wagon road crosses this township from section 34 to section 18, it is a very good road. The soil is a black loam varying from four to eight inches in depth, resting on a clay or hard clay subsoil. The surface is prairie and bluffs, with the exception of the northwestern portion of this township which is timbered with poplar, spruce and large willow. The country is generally level or undulating, but the land adjoining Peace river, Muddy creek and Boucher creek is hilly and broken. Timber for building and fencing is plentiful in this township and fuel can be procured in large quantities on nearly every section. Hay is plentiful in the numerous sloughs scattered all through the township; there is also a large quantity of prairie hay. Muddy creek flows all the year round but the water is very muddy. Boucher creek was nearly dry at the time of the survey (August), and its water was hard and alkaline. Both creeks flow in very deep ravines. There are no water-powers and no mineral of any economic value has been found. There is a limestone quarry on section 7 west of Rat creek. This creek was also nearly dry at the time of the survey and its water was alkaline. A great quantity of spruce averaging sixteen inches in diameter is found in the ravines of Rat creek, Muddy creek, Boucher creek and also on the sidehills bordering Peace river. There is a current of about four miles an hour in Peace river and the water is very clear and good. All that southern portion of township 80, range 4, situated south of Peace river is thickly timbered with poplar, spruce and large willow. With the exception of a few coyotes, foxes and marten, no game was seen in that township.

(Dunvegan settlement.) Besides the two Hudson's Bay company's reserves in Dunvegan, I subdivided the northwest quarter of section 8 into lots, viz., lot 1 and lot 2, and on the south side of Peace river east, adjoining the Hudson's Bay company's reserve lot 3, a small parcel of land where the Roman Catholic mission have a building. The front road on the north side of Peace river was surveyed through the Hudson's Bay company's reserve, going east as far as the east boundary of section 8.—*J. B. Saint Cyr, D.L.S., 1908.*

*Range 5.*

77 and 78. The country adjoining the east boundary of these townships can be reached by the Dunvegan, Spirit river and 'Grand prairie' wagon road and also by the Spirit river and Egg lake road. The greatest portion of township 78, range 5, and the middle part of township 78, range 4, is prairie and bluffs; there is also some prairie near the north boundary of township 77, range 5. The remaining part of those townships is timbered with spruce, jackpine and large willow. The largest quantity of spruce and jackpine is found north of the twentieth base line and along Brulé river. This stream crosses in a northeasterly direction townships 77 and 78, ranges 4 and 5. The water of Brulé river is very clear and good; the current is very swift in that stream but there was very little water in it at the time of the survey. Swamp creek, a tributary of the Brulé river, has also good water. The soil in the above mentioned townships is a black loam varying from five to six inches in depth with a clay or hard clay subsoil. Besides the streams draining that country I believe that water can be procured by boring deep enough.—*J. B. Saint Cyr, D.L.S., 1908.*

79. The country adjoining the east boundary of township 79, range 5, can be reached by the Dunvegan and Spirit river wagon road. The soil is a black loam varying in depth from six to seven inches overlying a clay subsoil and is well adapted for farming purposes. About one-third (the southern portion) of township 79, range 4 and the south half of this township is prairie and bluffs. The remaining portion in those two townships is covered with poplar and spruce averaging fifteen inches in



## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 5—Continued.*

diameter with clumps of large willow, here and there. The country is undulating with the exception of the south part of those two townships where it is rolling. Spirit river crosses township 79, range 4 from west to east on sections 7, 5, 4, 3, 2 and 1; and township 79, range 5 on sections 12, 1 and 2. In the ravine of the river as well as on the sidehills there is a good quantity of spruce from eight to eighteen inches in diameter. Township 79, range 5 is also crossed from the northeast to the southwest by the deep ravine of Rat creek. This stream is a tributary of Peace river. Spruce of good dimension is plentiful on both sides of that creek which was nearly dry at the time of the survey. There are no water-powers in that district.—*J. B. Saint Cyr, D.L.S., 1908.*

*Range 12.*

19, 20 and 21. The land surveyed lies in the valleys of Chase and Charcoal creeks. The general direction of Chase creek is nearly due north. The stream averages twenty-five links in width and eighteen inches in depth and has a fall of about one hundred feet to the mile. In township 19, range 12, the creek bottom is only a few chains in width but in sections 7 and 18 there is some level land at a slight elevation above the creek. The soil is light and not very suitable for agricultural purposes. Farther down the creek, in sections 19 and 30, township 19, range 12, and in sections 24 and 25, township 19, range 13, there is a considerable area of fairly level land at an elevation of about one hundred feet above the creek. This land is, for the most part, lightly wooded, chiefly with jackpine and poplar, and is traversed by several small creeks. Section 24 in the latter township is probably the best for agricultural purposes. In township 20, range 12, the valley widens out and the creek bottom increases to twenty chains in width. The bottom land is densely wooded with cedar, spruce and cottonwood. The soil is a good black loam. Charcoal creek runs in a southwesterly direction and empties into Chase creek near the northeast corner of section 19, township 19, range 12. A high ridge rises quickly from the point where the two creeks join and separates the two valleys. From the mouth of Charcoal creek, for a distance of a mile and a half up stream the banks rise up steeply on each side. Above this there is a stretch of good bottom land three or four miles in length and varying in width from a quarter to three-quarters of a mile. The bottom land is covered with thick brush and poplar, willow, spruce, fir and jackpine. The soil is a good black loam with a covering of vegetable mould. There is some grazing land on the hillside to the north of the creek. Both Chase and Charcoal creek valleys are subject to summer frosts. Most of the potato crop was frozen in the last week of July. In places not exposed to the early morning sun very little injury was done. Six or seven settlers have located in the part surveyed, but only two were living on their places at the time of survey. Dairying and stock raising on a small scale could be carried on successfully. There are several roads leading to the upper end of the valley, but a more serviceable and better road could be made along Chase creek, connecting with the main road near Shuswap.—*J. E. Ross, D.L.S., 1908.*

*Range 13.*

19. (See report for townships 19, 20 and 21, range 12, west of the sixth meridian). —*J. E. Ross, D.L.S., 1908.*

20. The land surveyed is mostly rough and rocky. The elevation is 2,000 feet above Thompson river. In section 20 there is a small strip of good land and again in the southeast quarter of section 28 and in the northwest quarter of section 27, there is some good level land, heavily wooded, at an elevation 1,100 feet above the Thompson.

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## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 13—Continued.*

It can be reached at present only by a rough trail from a point on the Kamloops-Shuswap wagon road, but a fairly good road can be made at a moderate cost.—*J. E. Ross, D.L.S., 1908.*

*Range 14.*

19. Part of sections 35 and 36 were surveyed in this township. The land is rolling and lightly wooded with fir and pine. The elevation is about 800 feet above Thompson river. There is a good road leading to Ducks, a station on the Canadian Pacific railway, eight miles distant. The soil is a good sandy loam and water is scarce, but sufficient water for domestic purposes can be obtained from wells.—*J. E. Ross, D.L.S., 1908.*

20. I surveyed the north boundary of section 24 in the north half of which a settler has located and made a snug farm out of some forty or fifty acres lying in a depression in the tops of the hills within a mile or two of Thompson river. The elevation is about 1,000 feet above the river. There is some good grazing land on the hills. There is a good wagon road, but it takes a circuitous route to avoid too steep grades.—*J. E. Ross, D.L.S., 1908.*

*Range 15.*

19. In sections 21 and 22 there is a little good land but it is considerably broken up with rocky ridges. The south halves of sections 15 and 16 lie on a steep rocky hillside.—*J. E. Ross, D.L.S., 1908.*

20. The several sections surveyed lie in the southeast corner of the township. They lie on top of the hills at an elevation of 2,000 feet above the river. The land is timbered and broken with rocky ridges. One settler has located here and made a snug home for himself. I think a few more settlers could be placed here. Water can be obtained by digging. A road leads to Ducks station, Canadian Pacific railway, by a circuitous route.—*J. E. Ross, D.L.S., 1908.*

*Range 16.*

18. The survey here was a retracement of old surveys. The part surveyed lies on top of the hills surrounding Campbell and Scuitoe lakes at an elevation of 3,500 feet above sea-level. There is some good meadow land around the lakes but this has all been taken up together with all the suitable land for settlement. Dairying and stock raising are the only branches of farming that can be carried on. There is an abundance of timber and firewood for all local purposes. The soil is a good sandy, gravelly loam.—*J. E. Ross, D.L.S., 1908.*

19. The survey was partially a retracement. The portion surveyed lies in a thickly wooded sidehill sloping northwesterly to Campbell creek. The altitude varies from 1,800 to 3,000 feet above sea-level. Most of the land is too broken for cultivation. Water is scarce and in the ponds it is alkaline, but sufficient for domestic purposes can be obtained by digging. There is considerable timber, pine and fir, averaging fifteen inches in diameter, fit for milling. Two settlers located immediately after the survey. There is suitable land for a few more.—*J. E. Ross, D.L.S., 1908.*

20. The land surveyed consists of some fractional sections on the north side of the South Thompson river, and along the north side of the Harper ranch, distant about ten miles from Kamloops from which there is a good wagon road. The sections along the river are broken by a line of clay bluffs one hundred and fifty to two hundred

## SESSIONAL PAPER No. 25b

## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 16—Continued.*

feet high. From the base of the hills to the river, a distance varying from a few chains to nearly half a mile, there is a gradual slope of open land covered with sage brush and suitable for farming if water were obtainable. The sections north of the Harper ranch are mostly along a rocky sidehill partly open and partly timbered with pine and fir. In section 15 there is some good rock suitable for quarrying. In sections 11 and 14 there is some land suitable for farming if water for irrigation purposes could be procured. A small creek flows through the land. It is used for irrigating the ranch above mentioned.—*J. E. Ross, D.L.S., 1908.*

*Range 17.*

21. Two parcels of land were surveyed, fractional section 16 adjoining Kamloops Indian reserve and Lot 315. The former is hilly and open with some scattered pine and fir. There is no water. Lot 315 is a low lying flat in a bend of North Thompson river. It is covered with poplar, willow and alder with large cottonwood along the river bank. The surface is undulating, low rounded ridges and hollows alternating, and, in consequence, not suitable for irrigation. Most of the lot would be submerged at the highest floods and part of it at ordinary high water. Although suitable for fruit or vegetables, and convenient to the Kamloops market, it is not valuable through being subject to floods.—*J. E. Ross, D.L.S., 1908.*

22. I completed the surveys of sections 35, 36 and 26. The survey of the two first mentioned sections was delayed through the boundaries of Lot 338, which occupied the best part of the two sections, being lost. However, by an arrangement between the agent and the owner, the survey was rendered possible.—*J. E. Ross, D.L.S., 1908.*

*Range 21.*

20. The land surveyed lies almost immediately south of Savonas, a station on the Canadian Pacific railway, to which there is a good road. The elevation runs from one hundred to one thousand feet above the station. The surface is hilly, partly timbered and partly open. At present it is used only for grazing land. The soil is good, but irrigation is necessary.—*J. E. Ross, D.L.S., 1908.*

*Range 22.*

15 and 16. The land surveyed here lies on the top of a mountain at an altitude of 5,000 feet. In the southwest quarter of section 34, township 15, there is a wild hay meadow of considerable size, and smaller ones are scattered through the adjoining sections. The surface is hilly and undulating and covered with a thick growth of jack-pine. The soil is light and sandy. A trail has been blazed out from the meadow to the valley of Shuhun creek, where there is a good pack trail.—*J. E. Ross, D.L.S., 1908.*

23. The chief object of the survey was to locate some wild hay meadows. The line surveyed runs through timber westerly from the valley of Deadman creek and rises 2,000 feet in the first two miles, reaching the top of the escarpment running parallel with the creek. From the top the line runs westerly and parallel to Barricade creek. The surface is rolling and covered with a thick growth of jackpine. The soil is of poor quality and the country is useless except for a little grazing.—*J. E. Ross, D.L.S., 1908.*

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## TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

*Range 23.*

20. Section 31, the only section surveyed, is fitted only for grazing, as there is no water for irrigation. There is no wagon road and at present the section is not easy of access.—*J. E. Ross, D.L.S., 1908.*

23. The land surveyed is rolling and covered with a thick growth of jackpine. Being at an altitude of 4,000 to 5,000 feet above sea-level it is not suitable for general farming. There is a good wild hay meadow of nearly one hundred acres in the south-east quarter of section 14, at the head of Barricade creek, which runs easterly and empties into Deadman creek about twenty miles from Savonas. There is a pack trail from the meadows to Deadman creek valley, where a road runs to Savonas.—*J. E. Ross, D.L.S., 1908.*

*Range 24.*

19. The part surveyed on the east side of Thompson river adjoins Oregon Jack Creek Indian reserve No. 6. It is hilly and broken in general, but there is some arable land. Water for irrigation is needed, but it is apparently not obtainable. It is partly open and partly openly timbered with fir and pine. There is a small patch of good bottom centred around the northeast corner of section 21, of which a part has been cultivated. The wagon road from Ashcroft to Highland valley runs through the part surveyed. On the west side of Thompson river I made a resurvey of some provincial lots and some fractional sections.—*J. E. Ross, D.L.S., 1908.*

20. The land surveyed is situated on the south side of Thompson river, and most of it about four miles east of Ashcroft, at an altitude of about 3,000 feet above sea-level. The land is rolling, hilly and broken, partly open and partly timbered with fir and pine. As there is no water for irrigation the land is fitted only for grazing. There is no direct road to the river, probably on account of the steep hillside.—*J. E. Ross, D.L.S., 1908.*

*Range 25.*

17. The land surveyed here is within two or three miles of Spence Bridge, a station on the Canadian Pacific railway. On the east half of section 16 there is a little good land. It is not easy of access at present as there is no road and a steep ascent of 2,000 feet or more.—*J. E. Ross, D.L.S., 1908.*

18 and 19. The work in these townships consisted of a resurvey of some provincial lots and a survey of a few sections to complete the portion fronting on Thompson river.—*J. E. Ross, D.L.S., 1908.*

*Range 26.*

16. The part surveyed lies in the northerly end of the Botanie creek valley. The valley is about one and one half miles wide and has steep mountains on the east and west sides. It is hilly and rough and covered with a thick growth of small woods. There is some timber, fir and pine, on the east side of the creek. It is well watered and adapted for dairying and stock raising. The altitude is probably too great for general farming. There is a good road down the valley to Lytton station, about ten miles distant.—*J. E. Ross, D.L.S., 1908.*



Looking up Blackberry River. Photo. by P. A. Carson.

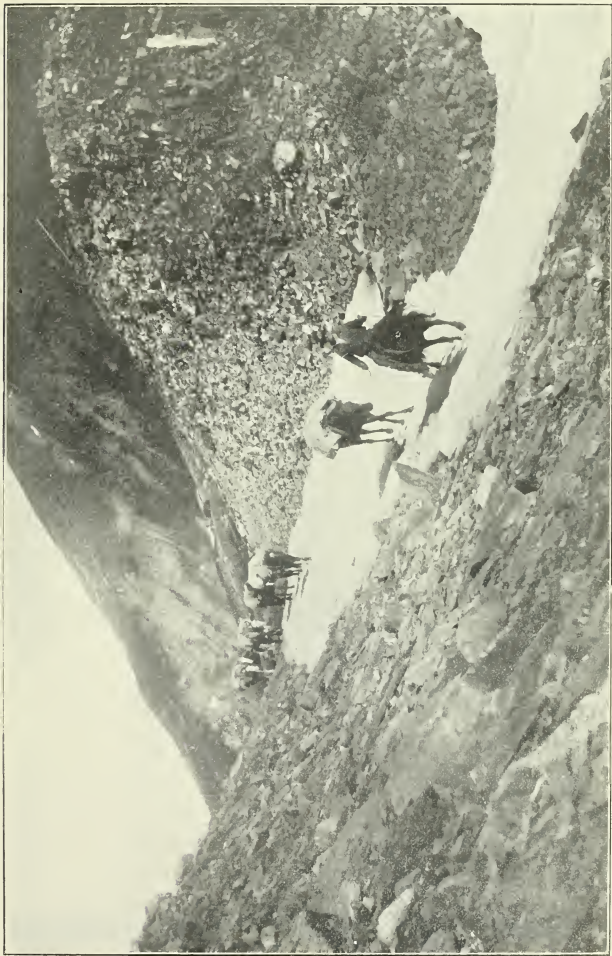




Blaeberry Falls. Photo. by P. A. Carson.

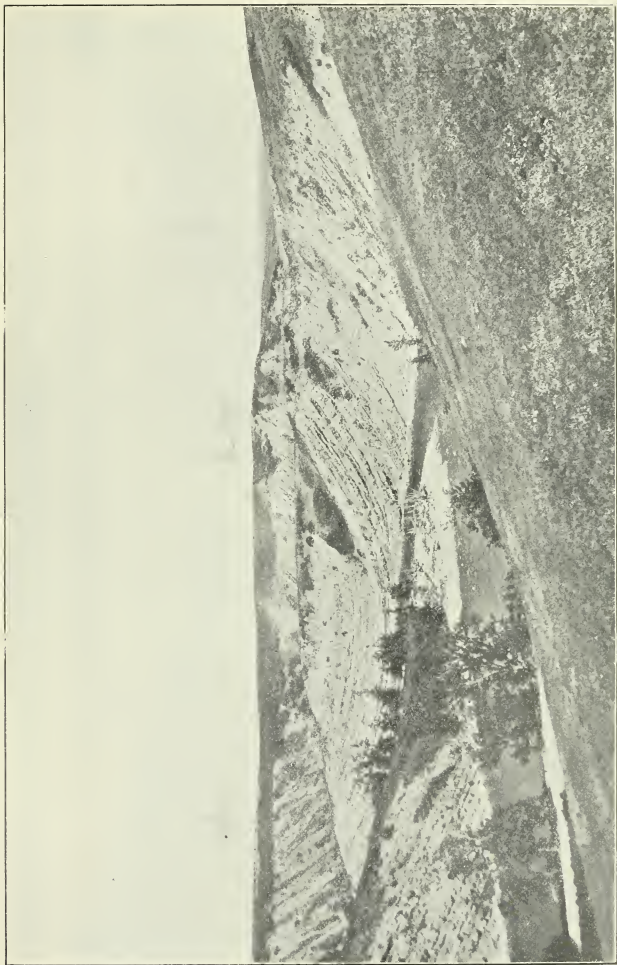






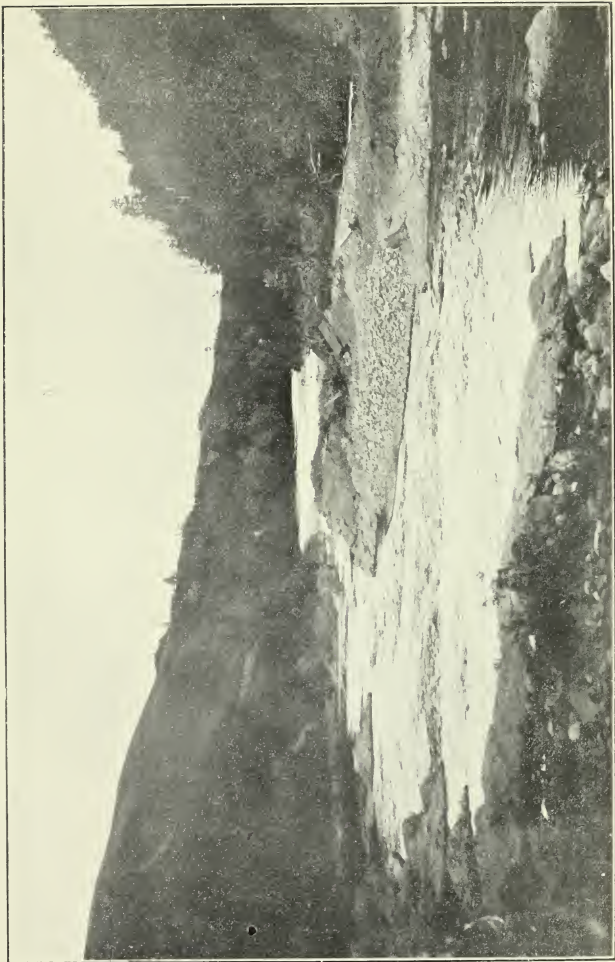
Six-Mile Creek Pass, Photo. by P. A. Carson.





Waterton River Canyon. Photo. by W. Thibaudan.

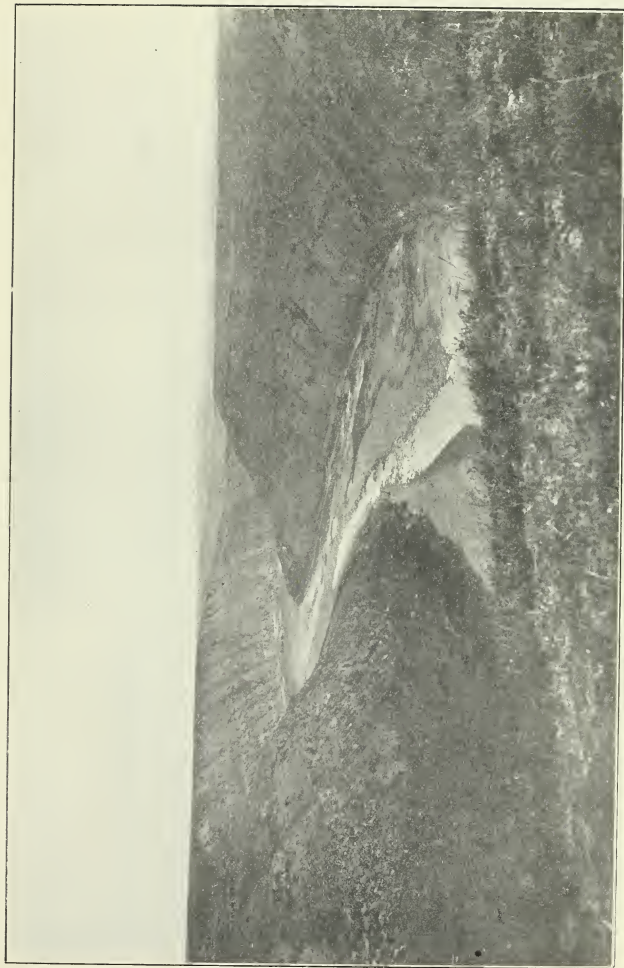




Canyon on Southfork River. Photo. by W. Thibault.

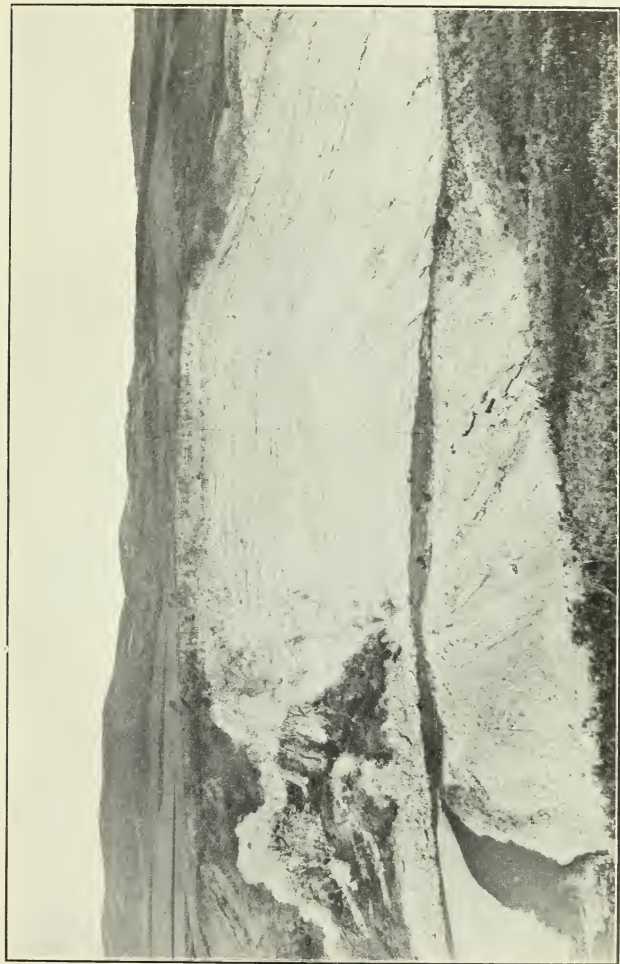






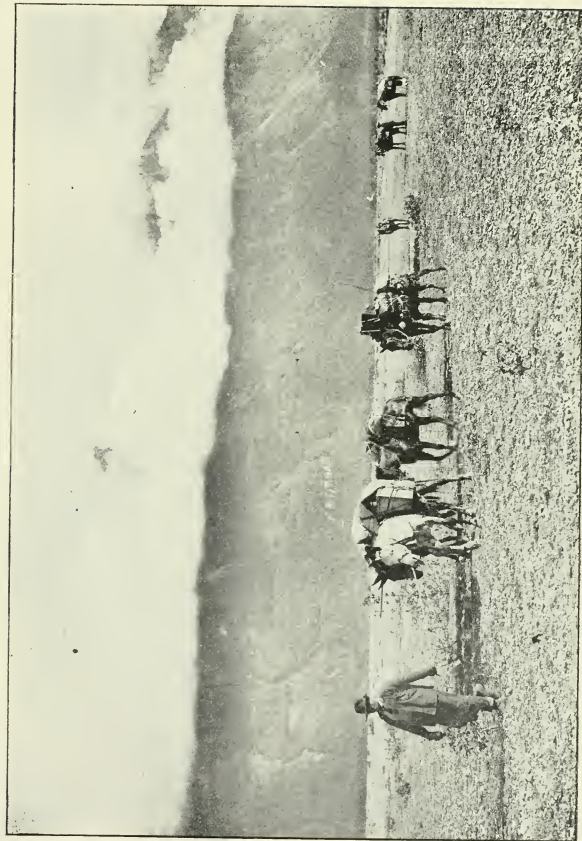
Canyon on St. Mary River. Photo. by W. Thibaudan.





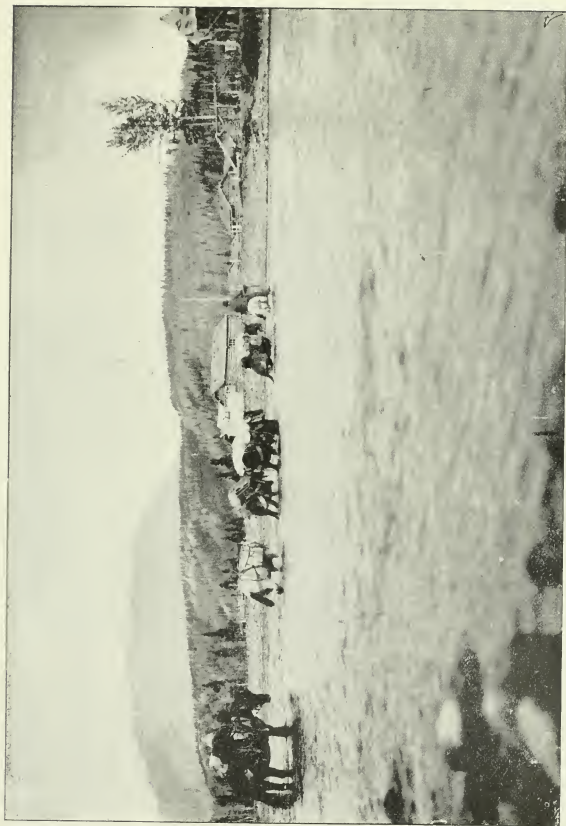
Crowsnest Pass. Photo. by W. Thibaudan.





Packing up Dalton Trail, River Bottom. Photo, by G. White-Fraser.





Crossing Tatshenshini River at Dalton Post. Photo, by G. White-Fraser.

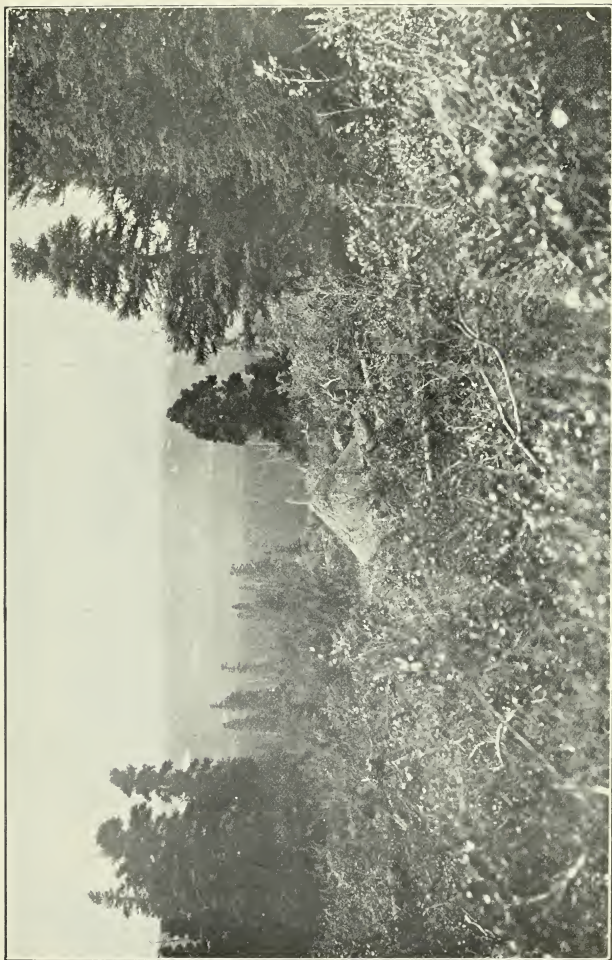






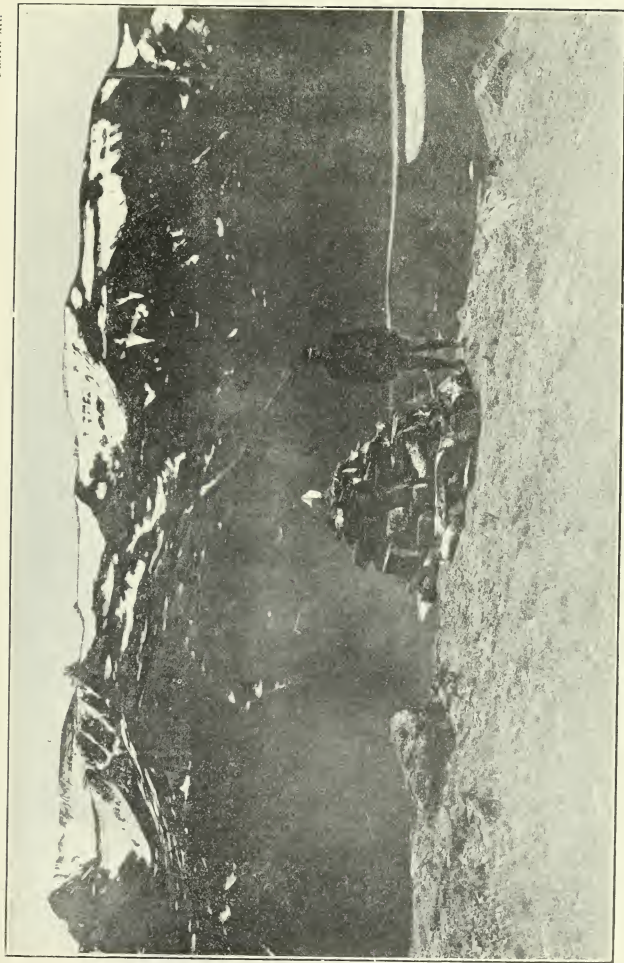
Looking West across Tatshenshini River. Photo. by J. N. Wallace.





Earth Mound, No. 147 on the B.C.-Y.T. Boundary. Photo. by J. N. Wallace.





Stone Mound, No. 141 on the B. C. Y. T. Boundary. Photo. by J. N. Wallace.

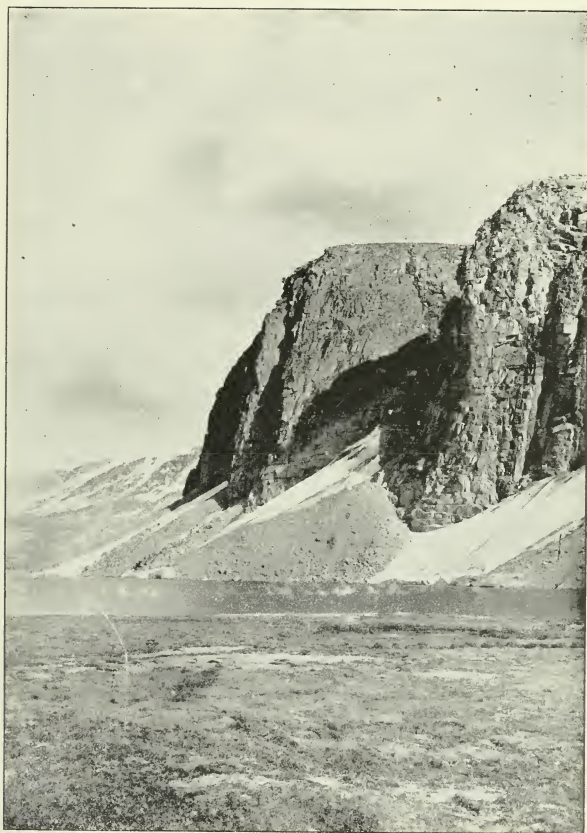






Looking East across Blanchard River. Photo, by J. N. Wallace.





Lake on Summit overlooking Takhini River. Photo. by G. White-Fraser.





Takhini River, looking West. Photo by A. Saint Cyr.





Lake Partridge. Photo. by A. Saint Cyr.

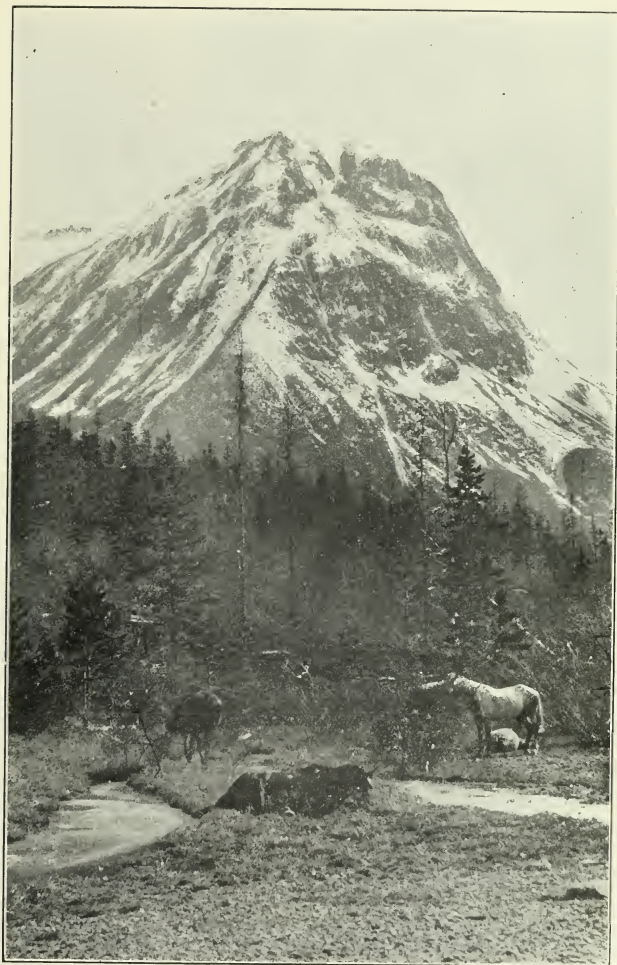






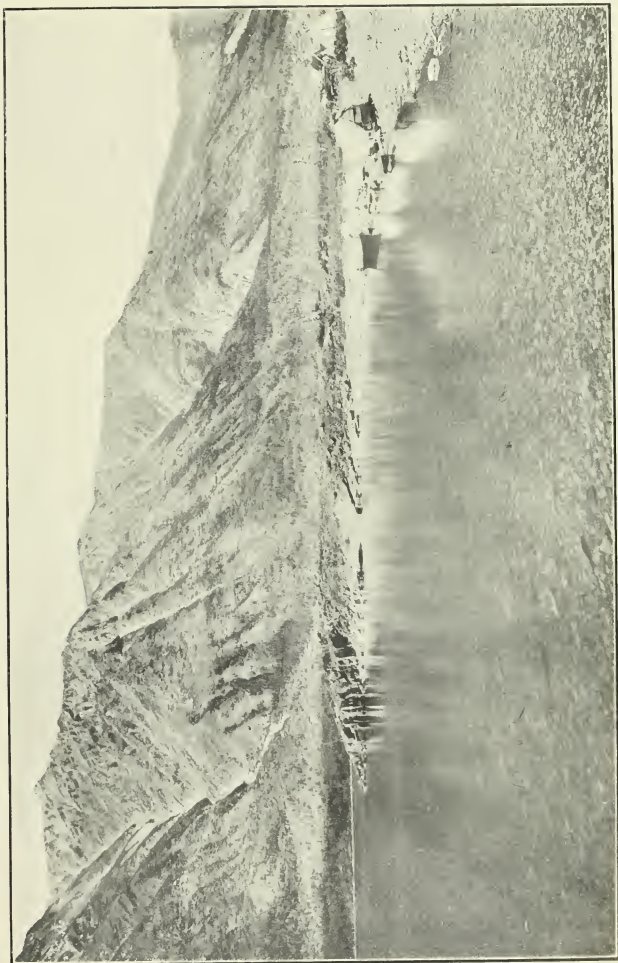
Gorge at the Head of West Arm. Photo. by G. White-Fraser.





Cleft Mountain. Head of West Arm. Photo. by A. Saint Cyr.





West Shore of Taku Arm. Photo. by A. Saint Cyr.







